STANFORD UNIV
MAY
3
1935
LIBRARY

THE INFLUENCE OF TECHNIQUE ON THE DECORATIVE STYLE IN THE DOMESTIC POTTERY OF CULHUACAN

BY

ANITA BRENNER

STANFORD UNIVERSITY LIBRARIES
WITHDRAWN

Submitted in partial fulfillment of the requirements for the degree of Doctor of Philosophy in the Faculty of Philosophy Columbia University 1930

3781
72 B

THE INFLUENCE OF TECHNIQUE ON THE DECORATIVE STYLE IN THE DOMESTIC POTTERY OF CULHUACAN

BY

ANITA BRENNER

STANFORD LIBRARY

Submitted in partial fulfillment of the requirements for the degree of Doctor of Philosophy in the Faculty of Philosophy Columbia University 1930

471582

PRINTED IN GERMANY
J. J. AUGUSTIN, GLÜCKSTADT AND HAMBURG

Contents.

Introduction 7

I. Composition 21
1. Centers 22
2. Rims 28

II. Design 38
1. Adaptation of design 40
a. Centers 40
b. Rims 46
2. Elaboration of new designs 59
2. Calligraphic influences 68

III. Rhythm 83

IV. Conclusion 93

Introduction.

The pottery of Culhuacan would not be considered interesting from an aesthetic point of view. Even the most sympathetic eye would not find it beautiful. The ware is coarse, thick, and carelessly formed, though well baked. It is yellowish orange in colour and is decorated with linear designs in black, applied hastily. The range of form is limited. It includes a few ollas, shallow curved bowls, plates, and deeper angular bowls on tripod legs. The most frequent of these forms is an almost flat plate, with a wide rim turned up at an obtuse angle from the base, and a bowl with a rim turned at a more acute angle, and curved slightly outwards. The former occurs with and without legs, and the latter usually with legs, which in some cases are crudely modelled into animal heads or paws, and slit to hold pellets which rattle when the vessel is moved. (See Plate A.)

Culhuacan is an ancient village site in the valley of Mexico. Attention was first called to its obviously utilitarian ware by Prof. Franz Boas, in connection with the archeological work of the International School of Archeology and Ethnology in the Valley of Mexico, in 1911—12.[1] Excavations were carried on under his direction by Miss Isabel Ramirez Castañeda. The yellowish ware found at Culhuacan belongs to the Aztec period of culture in the Valley of Mexico. Dr. Boas distinguishes three types. The first, the type of Culhuacan, includes large and small ollas, comales, plates, bowls with flat instead of convex or concave rims, vessels moulded in calabashes, and molcajetes, that is, three-legged plates with deep rims set at a somewhat steep angle from the base, and cross-hatched in the center. He describes the decoration of this type as follows: "The plates are always decorated inside; the vessels with vertical rims are decorated on the outside, so that the decorative elements which characterize the border are farthest from the center: near the edge of the plate when the decoration is inside; on vessels with steep sides on the lower part of the decorative zone,

[1] Anexo al informe del presidente de la junta directiva de la Escuela Internacional de Arqueología y Etnología Americanas. 1911—12 (Mexico, 1913). Album de colecciones arqueológicas. Pub. de la Escuela Internacional de Arqueología y Etnología Americanas. 1911—1912.

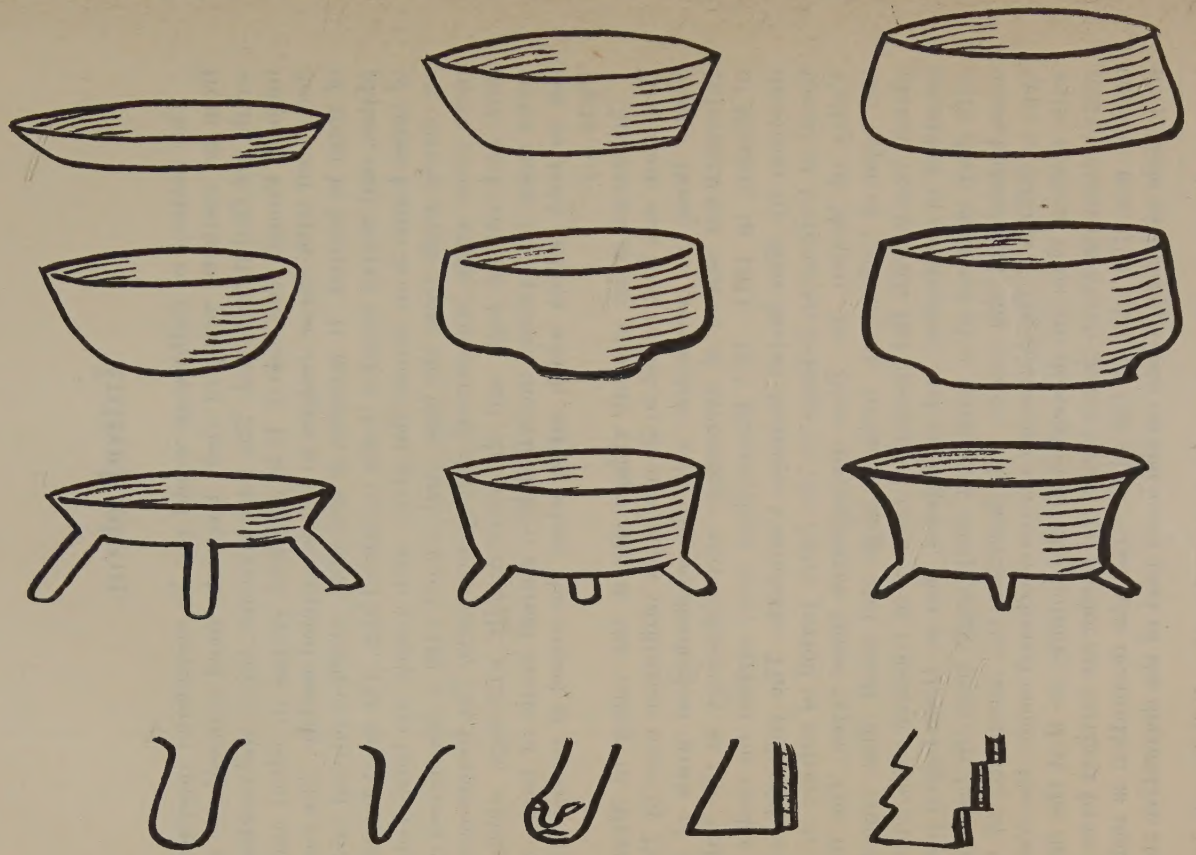


Plate A. Typical forms of Culhuacan vessels. Rounded legs more frequent on Type 1, flat and terraced legs on Types 2 and 3. Decoration on vessels with legs, usually inside; on vessels without legs, usually on the outer rim, except in case of extremely shallow bowls, when decoration is inside.

when it is on the outside. All the lines of these designs have been made hastily; for this reason the forms are frequently indistinct."

Dr. Boas distinguishes two subtypes. The first consists of thick plates decorated with central designs which are geometric, representations of animals, or related to Aztec hieroglyphs. The design is bounded by a thick wavy line, between which and the central design, occurs another decorative area, usually a band of geometric designs. These plates have somewhat conical tripod legs. The second subtype includes chiefly molcajetes and plates with wide flat rims. The ware is thinner, slighter, lighter in colour, and the designs are smaller. They are arranged in narrow bands and finished off with borders of rays or fringes. The legs on these plates are thick, solid, and somewhat conical. The design is treated hastily, apparently with even greater freedom than on the former subtype. This ware was found at a deeper level than the two other types, which are furthermore distinguished from it in other ways.

Type 2 is described by Dr. Boas as lighter in colour, and somewhat different in design, of which the characteristic feature is the use of thick parallel lines, used to delimit decorative areas and as decorative elements. The central designs on plates are very different from those on the Culhuacan type of ware. The grecque und scroll are used frequently as decorative design-motifs. Type 3 differs from Type 2 chiefly in that the ware is thinner and finer, the colour lighter, and the parallel lines narrower and more carefully made. The circle and the dot are used frequently in its designs, and the grecque also occurs.

Types 2 and 3 were generally found chiefly on the surface or just below it, and Type 1 occurs at a deeper level. This would indicate, if the deposit has not been disturbed, that the finer ware is the more recent; which might be corroborrated to some degree by comparison with that domestic ware of Texcoco which is presumably of late Aztec manufacture. The design-content on that ware is strikingly similar to the decoration on Types 2 and 3 of Culhuacan, almost identical, and the ware is similar likewise in that it is fine, and thin, though not all of it is of the yellowish colour characteristic of Culhuacan pottery. The late Culhuacan ware differs from the Texcoco ware which it resembles, chiefly in the freer treatment of the design. Although the site of Dr. Boas' collections and Miss Castañeda's excavations, as pointed out by Dr. Boas, appears to be chinampa land which has been much disturbed, the sequence of the types is quite clear. The time elapsed between the exclusive use of Culhuacan ware and the later ware may be quite short, for the strata may have been deposited rapidly.

On account of the importance of the question of time sequence I quote here Dr. Boas' statement.[1]

Es problema de gran importancia determinar si los typos ya descritos son del mismo período ó si el uno es más reciente que el otro. La investigación de esta cuestión se encargó á la Srita. Isabel Ramírez Castañeda. Se hicieron estudios en Culhuacán, que enseñan con toda claridad que allí el tipo de líneas paralelas es más reciente que el tipo de Culhuacán. Los resultados de dos excavaciones se muestran en los estantes núms. 5—8[2]. Los restos se han arreglado según la profundidad en la cual se encontraron, y siempre se ha escogido el treinta por ciento de todas las piezas que se han hallado en cada profundidad. Se ve luego que los tipos de líneas paralelas se encuentran solamente á flor del suelo y en las capas cercanas á la superficie y que no hay este tipo en las capas hondas. En dos excavaciones se encuentran los tipos amarillos y otro tipo azteca que tiene color rojo, con las frecuencias que siguen:

	Frecuencias en tanto por Ciento del Tipo.							
Profundidad	Culhuacán		Lineas		Rojo		Rayado	
	Ex. I	Ex. II	Ex. I	Ex. II	Ex. I	Ex. II	Ex. I	Ex. II
0—1 metros	55	59	27	24	17	17	1	—
1—2 ,,	84	90	4	3	10	7	2	—
2—3 ,,	86	89	—	—	10	8	3	2
3—4 ,,	88	85		—	8	11	4	4

La decoración del tipo de Culhuacán enseña que tiene que existir otro tipo en el cual los prototipos de los motivos de Culhuacán se usen, porque lo rápido de la ejecución de los dibujos de Culhuacán se puede entender solamente, si las formas ya eran determinadas como las de la escritura. Todavía esta clase de cerámica no se ha encontrado.

At all events, Type 1 with its two subtypes *a* and *b*, stands out as a distinct style, and Types 2 and 3 as distinguished by Dr. Boas retain the value of stylistic definition. This latter ware is thinner and finer, so that conceivably technical improvement may be said to have occurred, but this would not necessarily be so, since again, crude and fine ware was made in the Valley of Mexico contemporaneously, and ware of a great many degrees of technical perfection is made contemporaneously in modern Mexican pottery centers.

[1] Escuela Internacional de Arqueología y Etnología Americanas, Año Escolar de 1911—1912, p. XII.

[2] Refering to an exhibit of the excavations.

It is furthermore the case that the heavier and cruder Culhuacan ware is as a rule more complexly decorated than the finer. This complexity of design does not mean that a great number of design-motifs are used, though they are numerous in comparison with the design-content of the finer, and it may be later, ware. On both, Types 2 and 3, a limited number of motifs are used in varied ways, more varied and more complex in arrangement on the cruder ware. The fact that the shards of Type 1, with its subtypes *a* and *b*, are more numerous in Culhuacan than both Types 2 and 3 together, might indicate that the freer style was of longer duration, and the greater variation within a single style might also suggest a lengthier period.

It would not be possible in any case to trace the development of Culhuacan pottery as if it were the industry of an isolated people. When pottery was first manufactured in Culhuacan, cannot be determined at present, but it is clear that it was made in large quantities only after the Teotihuacan period, and, possibly, only after the Aztec culture was well differentiated from that which preceded it in this region. Thus the earliest ware was made at the same time and in the same region as many different carefully and delicately formed and elaborately decorated vessels. It would seem arbitrary therefore to ascribe its appearance to ignorance of technique, since the Culhuacan potters were surrounded by others from whom they might have learned, had they been in that need, and so inclined. Moreover the complexity of the design certainly does not indicate a "primitive" development. It would be also arbitrary to say that the crudity of the ware, and the slovenliness of the decoration, indicate a "degeneration", since it could not well be assumed a priori that Culhuacan alone had so degenerated, and furthermore the fact that the ware is well baked, and that it was produced in large quantities, would not agree with a hypothesis that the industry was declining. The explanation of careless, but complex design, treated in a way peculiar to Culhuacan, on crudely shaped, but well baked ware, must then be sought in the special conditions under which it was manufactured.

These conditions cannot of course be entirely reconstructed, but evidence enough for the purpose of this study may be available. The excavations at Culhuacan indicate, by the large number of shards, that pottery was manufactured there. Culhuacan ware is found in other places also (Teotihuacan, Texcoco) and that fact, together with the large quantity of shards in Culhuacan itself, would suggest that the industry supplied more than local needs. In the same way pottery of the Texcoco type is found in places of the surrounding

region, and also in Culhuacan. These villages must have traded with each other as well as with other villages, and it is not strange therefore that ware typical of several may be found in one place, as in Texcoco and Culhuacan, but it is possible to identify the local product by the relatively larger proportion of shards of its type found on the site. Technical and stylistic differences between the pottery of each village may thus be defined, though by no means rigidly, as it will be found that no one of the elements which make up the style of each place, are peculiar to that place. For example, neither the forms nor designs which characterize Culhuacan pottery, either of the earlier or later types, are strictly peculiar to it.

It has already been remarked that designs typical of Texcoco domestic ware appear on Types 2 and 3 of Culhuacan ware. These designs are to be found also on some of the ornamental ware of Texcoco, and on both the domestic and ornamental ware of other regions and earlier periods. Indeed, the scroll or spiral, the grecque, and the terrace, which form a bulk of the design-content of Texcoco domestic ware and Culhuacan ware (Type 2) occur on the earliest Mexican wares and are widely distributed on pottery over the entire continent. In the Aztec period they are by no means confined exclusively to ceramics, but reappear in textiles, architectural sculptures and paintings, and in codices. The rattle, modelled animal, and conical legs on Culhuacan ware also appear on vessels of other regions and very early in the Valley of Mexico, and the design-motifs on Type 1 Culhuacan ware can be identified as identical with those on ornamental and domestic ware of other sites and periods, or similar to them, and can be found used in other decorative media. (Shields, stone sculpture, architectural painting, codices.) Thus it would be hardly accurate to assert that the possibly later Culhuacan potters borrowed directly from Texcoco, or vice-versa, nor that the hypothetically earlier potters borrowed entirely from vessels made still earlier or in a different place, or that either they, or their successors, or the Texcocans, copied specifically the decoration of a stone monument, the border of a garment or the ornamentation of a codex. Rather, all of these artists drew upon a traditional store of designs constantly being applied in different media and with different kinds of technique, and changed thereby; so that the channels by which each artist or group of artists arrived at the content of their designs, would be far too complex to be traced.

Yet along with this stylistic homogeneity, extreme local and typological differentiation occurred. The domestic ware of Texcoco, for example, can be separated from the ornamental ware made in the

same place; and sometimes more easily than it can be separated from the domestic ware of a neighboring site, for example, Type 2 of Culhuacan. Again, though the ornamental ware of Texcoco uses many design-motifs and forms in common with the contemporaneous ornamental ware of places some distance away, as for example Tlaxcala, it can be easily distinguished. On the whole, the domestic wares of a wide area seem to be more similar than the ornamental wares of that area, and this would be expected in view of the greater elaboration of the ornamental wares. But it has been seen that even two domestic wares which use many forms and the bulk of their design-content in common, as for example Texcoco domestic ware and Culhuacan Type 2, can be distinguished wherever they may have been found, once the local type has been identified by archeological investigation.

The differences by which these two or any two superficially similar wares can be distinguished do not consist of the use of designs and forms exclusively peculiar to them, and this in a lesser degree is also true of the use of clays. It is true that the use of a local clay is the first means by which a local ware can be identified with certainty, but when several clays are used in common by several villages in a region, as happens in the Valley of Mexico, then the value of this factor for identification of a ware decreases. It is therefore not the occurrence of one or several elements in a ware, in themselves, which characterize that ware, but the combination of them; that is, the predominance of certain designs, certain arrangements, in combination with certain colours on certain forms made of one or of a limited number of clays. Thus in spite of great homogeneity within a region, or a culture, local and typological styles can clearly be perceived, since no one of them employs more than a limited number of elements. When, too, as in the case of Culhuacan ware, the elements common to other wares have been employed not only in a specific combination, but treated by a specific and peculiar technique, the distinguishing characteristic of that ware lies primarily in that treatment.

The style of Culhuacan pottery design can then be identified specifically by a treatment, the result of a technique peculiar to Culhuacan. It would be too vague, and it is superficial, to say that this technique is not a technique at all, but a lack of it, merely because the finished design appears unskilled. The consistency with which this appearance is maintained, by all the potters of Culhuacan and over a considerable period of time, in the face of other Aztec ceramics characterized by rigid precision of line and spacing, would suggest that the Culhuacan potters obeyed some

force of taste or circumstance, which developed their design in a direction opposite to the formality of Aztec style. Instead of further elaborating the design-motifs which they employed in common with other Aztec potters, they simplified them; so that in many cases these motifs appear in a short-hand version, as it were, or are broken up beyond identification. Along with this simplification, the Culhuacan potters, again in direct opposition to the habits of other Aztecs, abandoned linear and spatial precision, and permitted the movements of their hands to influence the appearance of the design. This freehand quality is the distinctive feature of Culhuacan ware, since in no other ware has it been adopted as a dominant stylistic element. The dominant influence of the automatic movements of the hand goes so far in Type 1*b*, that the designs take on the uniform, and at the same time highly individual appearance of handwriting. On Types 2 and 3 the "calligraphic"[1] appearance is still maintained, though not so exuberantly as on the former ware; and it is this stylistic trait that distinguishes Types 2 and 3 from the other contemporaneous domestic wares with which it shares forms and design-motifs.

In view of these circumstances it is desirable to investigate what factors helped to determine the predominance of the freehand trait as a stylistic element in Culhuacan design, as it would be fanciful to assume that the Culhuacan potters chose to go to this extreme merely because of artistic opposition to established Aztec stylistic tradition. For the purpose of this investigation it is necessary to examine insofar as evidence is available, the conditions under which stylistic differentiation occurred in the period and region to which Culhuacan pottery belongs.

The tendency to stylistic differentiation according to locale of manufacture, and the further differentiation according to the function of an object, can as a rule be found operating in the development of an industry which also becomes an art, as is usually the case in the making of pottery by hand. The influence of these two factors on the development of Aztec art would seem to have been emphasized by the system of guilds which governed Aztec manufacture and trade. Very little accurate and detailed information about this system as it operated at the time of the Conquest is available, beyond the fact that some such organization existed. Father Sahagun[2] submits a list of native arts and crafts and speaks

[1] The word "calligraphic" in this connection is meant to connote merely "handwriting quality"; not, as its etymology would indicate, "beautiful handwriting".

[2] Sahagun, Vol. II, pp. 389 et seq., Vol. III, pp. 34 et seq.

of them as being carried on by groups of workers each of which, in addition to rules of craft, possessed a patron deity and celebrated rituals and ceremonies specifically the prerogative and obligation of that group. It appears, too, that its products were marketed not by individuals but by groups, in the sense that each group sold them in the same place and on the same day, much in the way that the products of small Mexican villages, in the plateau region at least, are marketed today: each village sets apart one day of the week for its "tianguis"; merchants not natives of that village bring their wares upon that day, and in turn the natives take their wares to other villages on their respective tianguis days.

Father Sahagun also states that children usually adopted, or rather, were taught their father's trade. Thus it would seem that to some degree, trades were family as well as village traditions, and the latter may possibly have been an extension of the former if, as seems probable, villages were also in many cases larger family groups. It is not clear whether the "guilds" extended beyond their locales, whether, for example, the group which made domestic pottery in Culhuacan, was considered part of the group which made domestic pottery in Texcoco. At all events it appears that differentiation and specialization was emphasized by social organization, and that a further differentiation, beyond that of locale and purpose, may have occurred: a specialization of the family, within an already specialized group.

The conditions under which pottery is made and sold in the plateau region today seem similar in many ways to those reported in operation at the time of the Conquest, so that perhaps an examination of these conditions may throw some light on those which prevailed in late pre-Spanish times, and which doubtless obtained at least through part of the colonial period. The manufacture of pottery in the Valley of Mexico and in the plateau region as a whole, is confined to certain villages which are known chiefly for these products, in the same way that other villages are known for other crafts, such as, for example, lacquer-work. A considerable proportion of the population of these villages engages in the local craft. The villages and towns which make domestic ware are more numerous than those which make ornamental ware. In some cases both are made in the same place; others produce exclusively ornamental, or exclusively domestic ware. In all these cases the making of pottery is a profession, not a household art.

As a rule the wares are sold in the place of manufacture; also in the nearest large town, and from there to the next largest, and finally to the capital. Ornamental ware is nearly always certain to

reach the capital on the date of some large fair, which is analogous to the "tianguis" of smaller places. Domestic pottery is sold chiefly to the region surrounding the place of manufacture, but it is sometimes taken to market a considerable distance away. The results of these habits is that several types of domestic pottery may be found in most peasant households, the predominant type being that manufactured locally, or in the region. Ornamental wares (except toys and ritual objects, such as incense holders) are seldom bought by the potter's neighbors, possibly because they do not like them, and it may be because they cannot afford them. It need not be assumed that this is a practice which did not obtain in the Aztec period, since apparently ornamental wares were usually destined for the houses of nobles and priests, and, as now, were also traded a greater distance than domestic wares. It should be added that the curio-shop trade has affected the marketing system to a slight extent.

This system of marketing seems still to go hand in hand with extreme local and typological differentiation of wares. It is quite possible to determine from the appearance of an object its place of manufacture, regardless of where it is sold. This is especially true of ornamental ware. The domestic wares resemble one another more closely, but they can also be allocated by detailed examination of ware and style of decoration. Furthermore domestic ware manufactured in a village which produces ornamental ware as well, does not resemble the ornamental ware as much as it does the other domestic wares of the region, and even, domestic wares of the entire plateau.

In addition to local and typological differentiation, family and individual specialization also occur. This happens, for example, in the village of Tonalá, Jalisco. This village produces much of the ornamental ware sold in the nearby city of Guadalajara and in the capital. Some of its potters also make domestic wares which are sold in other villages of the region, and also in the larger towns and even to peasants marketing in the capital. A large proportion of the male population of Tonalá makes pottery as a profession. One part of this population makes exclusively ornamental ware, and that part which makes domestic ware does not make ornamental pottery. The potters who make ornamental ware, each make exclusively one type, which is a unit of ware, form, style of decoration, and design-content. These types differ greatly, and there are many of them. So far as they know, the potters do not imitate one another's wares or styles. Instead they elaborate their own, which as a rule has been inherited, so that the profession and the style are in

a sense a single piece of property, and are so considered. I do not know what measures would be taken if one potter were to "steal" another's style, but it appears that this is not likely to happen, in view of the fact that each of them retain their own with a sense of family pride. If not property, then they are at least family tradition. For example, the male members of the Galván family make the same kind of ware, which is ornamental. This is different in every way from the pottery made by their neighbors, the Lucano family. One of the Galván family, Amado Galván, has created a style of his own on the basis of his family style, and his pottery is distinguished by a greater delicacy and greater skill of execution, rather than by any radical departures from the type and style of older Galván wares.

The degree to which family specialization obtains can be vividly illustrated by the example of the Panduro family, who live in Tlaquepaque, a village near Tonalá. The male members of this family make exclusively small terracotta figurines, usually portraits or occupational types. (Fruit-vendors, potters, tortilleras, tlachiqueros, etc.) To my knowledge this style has not varied perceptibly for over twenty years. The individuals of this family in turn each make preferably, and it may be exclusively, one kind of figurine, that is, one makes portraits, another occupational types, and still another makes a more specialized kind of figurine. The use of molds contributes to the family conservatism of style which this example further illustrates.

If it is true that these conditions are analogous to those which obtained in the Aztec period, the fact that the potters of Culhuacan produced almost exclusively, if not entirely, domestic wares, leaving ornamental products to other groups and places, might be accounted for; and the stylistic stability of their decoration, together with its tendency to develop in a direction dictated by purely local tradition or circumstance, may also be explained. The potters of Culhuacan can then be considered in the light of specialists in domestic ware, whose products supplied the needs of a relatively large surrounding area.

It may then be assumed that these needs required of them a large amount of sturdy, usable pottery of little value, and in a sense prohibited artistic elaboration of this ware, since, first, decoration is not necessary to a utilitarian object whereas it is the prime consideration (along with careful form, of course) in the manufacture of ornamental ware; and second, more important, the care and time spent on elaborate ornamentation would tend to increase the value of the vessels. Thus the usefulness and durability of the object,

and its rapid manufacture, would seem to be the two chief factors considered most important by the Culhuacan potters, and it is therefore possible to assume that these considerations influenced the appearance of the ware.

It is a problem in how far the purpose for which the pottery was made, and the conditions of rapid production in large quantities, diverted the experience and decorative skill of the potters into channels other than primarily aesthetic, or whether this experience and skill was not able to produce other than thick, crudely shaped vessels with carelessly applied designs. However, even if the technique of these potters had not been developed beyond the point which their products indicate, this was probably because their interest was not concentrated upon skilful and artistically perfect wares, but rather upon durable and cheap ones, and thus the fact that they did not choose to imitate or learn from their neighbors who did produce more beautiful wares, can be understood.

It has already been stated that the pottery of Culhuacan is well-baked, but thick and coarse, and thus more fitted for ordinary household use than the thinner more carefully finished wares of Texcoco, since obviously a thick vessel is less liable to breakage than a thin one, especially if it is a large or even a medium-sized vessel. Durability then is the only necessary requirement of a household vessel and, from a strictly utilitarian viewpoint, decoration is superflous. The fact that this ware was decorated indicates that both makers and users were accustomed to see decorated pots, and the amount of decoration on Culhuacan ware, would presumably also be due to a habit of seeing pots with a large decorative area.

These circumstances disclose an extremely interesting problem in the dynamics of style. Two indispensable influences operate in the making of an object by hand. They are, the psychological and the mechanical. The functional relation of these factors to the ware of Culhuacan has been broadly outlined and it has been found that lack of concentration on artistic elaboration and emphasis on rapidity of production most probably obtained; and that such decoration as occurs, was applied from force of habit, as it were, and without intense attention; which would mean that the psychological factor operated automatically, a result of old habits, and that the mechanical factor also operated freely and without direct conscious control, that is, also as a habit. An analysis of the decoration may therefore reveal how much of the design-content and arrangement was retained by visual habit, and, in how far and in what ways the free operation of motor habits changed this arrangement, design-content, and the lines of the designs themselves.

This study therefore consists of that analysis, insofar as the fragmentary nature of shards will permit. The decoration of Culhuacan ware will be examined in the following aspects:

I. COMPOSITION.

Types of decorative arrangement natural or common to the geometric forms of the objects to be decorated, and influence of motor factor upon the forms of composition adopted in Culhuacan ware.

1. Centers
2. Rims

II. DESIGN.

1. Design-content not peculiar to Culhuacan ware, and changes made by adaptation to decoration of specific forms.
   a. Centers
   b. Rims
2. Elaboration of new designs out of subject matter not peculiar to Culhuacan ware.
3. Changes made by freehand habits upon designs. Elaboration of new designs by a combination of freehand influences.

III. RHYTHM.

This analysis is not made for the purpose of elucidating the history of Culhuacan domestic ware specifically, but rather, it is an attempt to discover the nature of some processes which, presumably, may occur in the development of any artistic style, and further to detail in as exact a manner as possible, the ways in which these factors may affect decoration, and have affected the decoration of Culhuacan pottery. For this reason the processes, the increasing influence of which is traced in the decoration of Culhuacan pottery, are not traced chronologically, for it has been found that this increased influence does not correspond necessarily to the chronological changes outlined from stratigraphic evidence, but instead to an intensification of the conditions which govern the particular factor under discussion. Therefore the examples which illustrate the development of any of the tendencies under discussion, are not chronological series, but stylistic ones, and it is quite possible, but immaterial to the discussion, that the example which may illustrate the extreme development of any influence, may have been made before, or at the same time as the example which illustrates lesser development of that particular influence.

However, since the material has been viewed as a stylistic whole, subdivided into stylistic groups, there is some slight correspondence between these groups and the chronological history offered by Dr. Boas, though it must be emphasized that this correspondence is by no means an ascending intensification of all the influences, nor a uniformly descending degree of these influences on the entire style. Each has been treated separately, and it has been found that the periods observed by Dr. Boas correspond, in a general way, to stylistic changes brought about by the intensification or discard of one or several of the many factors which help to determine the stylistic nature of the whole. It is hoped that these observations, on the basis of the analysis offered, may help to integrate a concept of the development of style according to laws which have been observed in other cultural phenomena, as distinct from the laws which describe biological evolution.

I. Composition.

The arrangement of a decorative design cannot be described, or in fact, conceived, apart from the form on which it is applied. Certain spatial and kinematic compositions are derived from each form, and it may even be said that they seem inherent in them. For example, a rectangle is not seen continuously as a whole, but tends to divide itself into geometric zones: bifurcated vertically, horizontally, and diagonally. Similarly a circle is perceived as a circle, and also is divided into concentric circles, and radially from the center, leading to the division of the circle into a cross or a series of rays. A horizontal band may be conceived as consisting of several parallel horizontal bands, or may be divided vertically into equal spaces. More complex forms tend to separate, visually, into simple forms of which they are composed.

Thus decoration will often be applied in such a way that it delineates or emphasizes these geometrical divisions. The form itself will be emphasized as a whole, by decoration of its outlines, i. e., the rim, in the case of a circular vessel most especially. Complex forms will be divided into their simpler component forms, by decoration of the zone which sets off the dominant simpler form, for example, the neck of a jar. Decorative arrangements which conform to this visual zoning are often symmetrical.

It may be questioned whether these imaginary divisions are not dictated by the habit of seeing decoration which conforms to this type of zoning, and whether the Culhuacan potter would see a circle or a rectangle divided in the same way we do. This question cannot be dogmatically answered, but since this type of decorative arrangement occurs in all styles, it may be assumed at least that it is not determined by any special stylistic tradition. It is true that symmetrical composition is not the dominant characteristic of all decorative styles, (as it is of the Greek, for example) and indeed, some poeple and some artists deliberately prefer asymmetrical decoration; which might be said to be a sophisticated way of emphasizing the formal zones which may reasonably be assumed to be universally perceived. This type of composition must be differentiated from arrangements in which the form on which it is applied is completely disregarded, very often because the design has been taken over from another form to which it was adapted. A further distinction should be made between spatial or geometrical symmetry, and identity of forms arranged according to spatial

symmetry. The former refers purely to the manner in which zones are divided, and the latter includes correspondence or identity of designs in corresponding zones.

Several different types of composition occur on Culhuacan ware. All the decorated forms are circular, but practically never a simple flat circle. The simplest circular form, the plate, occurs in a complex form, made up of center and rim, set off at a shallow or a deep angle from the base. In the majority of cases the decoration is applied on the inside of the vessel, and, while this would be expected in the case of a shallow vessel, it is also the preferred mode of decorating deeper vessels the rims of which are set at an angle on the base. Semi-spherical bowls are usually decorated on the outside of the rim, and the decoration is arranged in one or several horizontal bands. If they are decorated inside, the design is, as a rule, exceedingly simple. Similarly the horizontal zones on the outside tend to be made up of simple designs. Some of the legged vessels with rims set at an angle on the base, are decorated on the inside and the outside of this rim only, the interior of the base being cross-hatched. In most specimens the decorative zone on the inside is larger than the corresponding zone on the outside, and in many cases the decoration on the outside is merely an extension of the inner band, actually as if the design had been folded over upon the outside edge. Accordingly the two predominant types of zoning which occur in Culhuacan ware, are: central, simple circular and banding.

The decorative arrangements on the interior of shallow vessels, i. e., plates and shallow bowls, will be examined first, from the viewpoint of arrangement on a theoretically simple circular form, disregarding for the moment the decoration on the somewhat raised angled rims of the plates, or on the concave sides of the bowls, since the immediate concern is with the center itself, as a separate zone. It should be understood that when symmetry of spacing or of design-motif is referred to specifically on any one of the examples examined throughout this analysis, the symmetry which is meant is theoretical, that is, it is the arrangement or the design conceived by the decorator and only approximately achieved. Rigid spatial or formal correspondences will of course be absent in decoration which is at all influenced by hasty movements of the hand.

1. Centers.

Fig. 1 is an example of arrangement without regard to geometric zoning, or for design symmetry. The center is a picture, presumably taken over from other media, and adapted only to the outline of the circle in which it is placed. Fig. 2 illustrates the simplest type

Fig. 1

Fig. 2

of absolutely symmetrical arrangement. The central motif is composed of three concentric circles. These are surrounded by a double line which dips radially, to form ten scallops. It is interesting to note that the line of scallops nearest the center dips upward, so that the single curves join in acute angles, while the outer line has been made dipping downward, so that all the outer turns are curved, not angular. This difference is the result of working, in the first case, from the center towards the rim, and in the second, from the rim towards the center. The contrast between the results is an illustration of freehand influences which will be discussed later. The large zone which contains the scallops is, spatially, also a concentric circle. It is outlined by three more simple lines which make concentric circles; next, comes a simple wavy line which is a version in smaller proportion, of the scalloped lines, and the complete circle is finished off by a broad band. It is thus clear that the entire decoration may be resolved into radial and concentric zones. The design itself is likewise theoretically, formally symmetrical: that is, the designs on opposite corresponding zones are identical.

The composition of the central design on Fig. 3 is more complex. It can also be resolved into radial and concentric zoning, with the addition of one element which, while it emphasizes the spatial nature of the form decorated, discards symmetry of design. This element is contained in the small elongated scrolls which are joined to the outer concentric circle of the central motif. The direction in which the scrolls are turned, that is, away from each other in the manner of a swastika, gives the entire composition (disregarding the rim) a rotary movement, which emphasizes consciously the rotary suggestion of concentric circles. The scrolls are not placed in such a way that they correspond symmetrically with each other on opposite zones; instead of corresponding vertically or horizontally, as in the simplest type of design symmetry, they correspond circularly, that is, each scroll would (theoretically) fit into the other if moved to the right, instead of if folded down or across.

The central design in fig. 4 illustrates another type of complex composition. The center is set off from the broad rim by two concentric circles. Inside of these are two zones surrounding the central figure. The outer zone consists of radial lines, the inner of three concentric circles delineated by means of dashes. The nucleus itself is not zoned radially or concentrically, nor is it arranged to give a rotary movement. It is, however, formally symmetrical on a vertical line, that is, if the design were folded upon itself vertically,

Fig. 3

Fig. 4

the two halves would theoretically correspond. This design would fit more "naturally" into a triangle or into a rectangle than it does into a circle, but it is adapted to a circle as well as to any other regular form through its vertical symmetry. The principal curve of this design is used in conventional representations of a reptile head and in pictorial representations of vessels, mounds, and places. Here it is hardly possible to ascertain whether or no a picture was intended

Fig. 5 illustrates a complex composition adapted to a circle.

Fig. 5

It is symmetrical both spatially and formally. The outermost zone is filled by rays; the two zones adjoining it continue the radial lines, and at the same time suggest concentric circles. The central nucleus is contained in a circle, and is itself spatially and formally symmetrical on vertical and horizontal lines. It may be assumed that a double spiral appeared on the left as well as on the right of this design, and that this spiral was identical in form with the one which is visible on the shard. These spirals form properly a part of the central nucleus, and, like it, are symmetrical spatially and formally on vertical and horizontal lines.

All the designs so far examined, with the exception of fig. 5, belong to Type 1*a*. Fig. 5, which is more complex as regards composition than the preceding four, belongs to Type 1*b*. Fig. 6, the most complex as regards composition, also belongs to Type 1*b*. and it is interesting to observe that the carelessness with which the design is applied does not affect the complexity of its arrangement,

Fig. 6

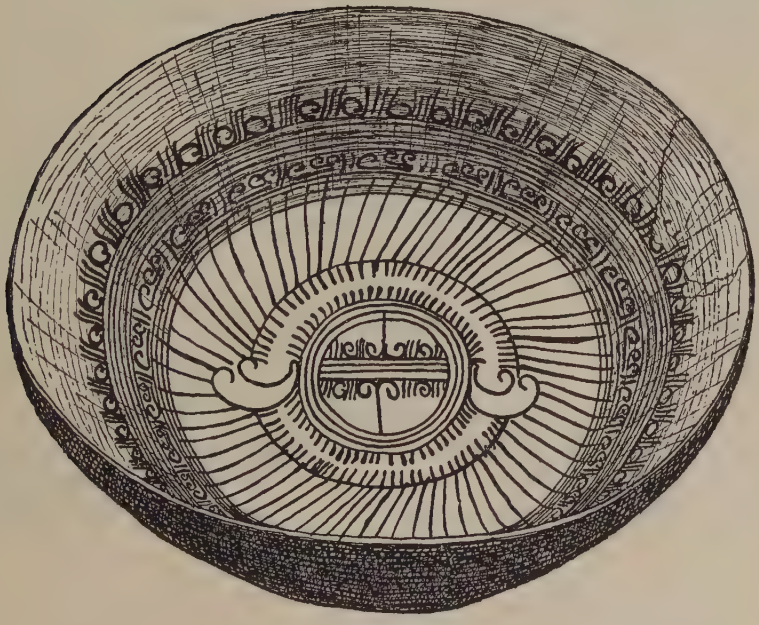


Fig. 7

and indeed, as will be seen upon examination, this complexity is increased by the free play of the decorator's hand.

The central nucleus is symmetrical formally and spatially, on vertical and horizontal lines, in the way previously observed in fig. 5. It is contained in a circle which lies within another circle. The positions of the spirals to the right and left correspond, but are formally symmetrical only on the horizontal line. Short dashes around the inner concentric circles indicate rays, and at the same time suggest another circle, as in fig. 5. However, the rays which fill the outer zone have been changed into diagonals which give a rotary movement. This change is the result of the free play of the hand, since except rigidly controlled, the hand decorating a circular space with radial lines such as these tends to make them into oblique curved lines turned either to the right or to the left. The slight concavity of the vessel would accentuate this tendency. Thus the composition contains all the kinds of decorative zoning which have been discussed, and the free play of the hand has produced an additional element, that is, kinematic rhythm.

The central design on fig. 7 will illustrate the acceptance and formalization of this element. It will be seen at once that the design is applied much more skilfully and carefully than on fig. 6, but that the composition is almost identical. The central nucleus is again symmetrical as to zoning and design both on vertical and horizontal lines. It is contained in a series of four concentric circles instead of only two as in fig. 6. The zone adjoining the outermost concentric circle again, as in fig. 6, indicates rays and also suggests another concentric circle; this element is repeated, presumably for emphasis, like the duplication of the number of concentric circles, and is outlined by still another circle. The spirals differ somewhat in form, since in fig. 6 the two spirals on each side are delineated to correspond with another and thus form only one on each side, whereas in fig. 7 they are separated, and the element is thus duplicated. They are still, however, spatially symmetrical to each other, and formally, on a horizontal plane. The outermost zone here consists of curving lines, deliberately made oblique, freely but carefully also, introduced into the decorative zone which properly belongs to the sides, thus giving an even greater emphasis to the rotary movement which they produce.

2. Rims.

Fig. 8 *(a, b, c)* will afford further illustration of the way in which the free play of the hand may increase complexity of composition. These three fragments, like figs. 5, 6, and stylistically fig. 7, all be-

long to Type 1*b*, which of all the groups of Culhuacan ware is the one most influenced by this "calligraphic" element. The shards *a*, *b*, *c*, on fig. 8 are rim fragments, on which may be seen two decorative zones; in at least the last two, the inner zone is properly part of

a b c

Fig. 8

the central design. On *a*, the inner rays are more or less rigidly held to a vertical, and the outer rays are allowed to slant and curve as the movements of the hand determine. On *b*, the inner rays tend to slant, and the outer rays slant obliquely in the same direction, and thus the composition consists of two somewhat similar, and yet different elements. On *c*, some of the inner rays slant in a direction opposite to the slant of the outer rays. This opposition is probably due to the fact that the inner rays seem to have been made from left to right, and the outer ones from right to left, and, since the movements of the hand have been allowed to determine freely the direction of the lines, an at least potential opposition results, which if intensified would produce the double rotary movement (in two directions) which is here merely suggested.

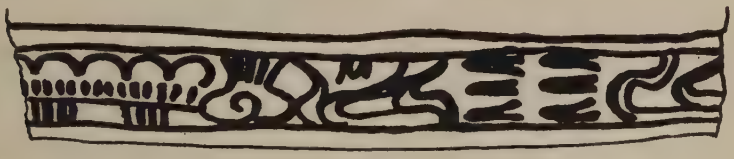


Fig. 9

The composition of the decoration on the rims is analyzed separately because the rim is considered as a separate decorative zone, that is, as a horizontal band as distinct from the circular form of the center, and it is furthermore set off in most vessels by being raised from the center, either concavely, or at an angle. The first rim considered, fig. 9, is analogous to the center fig. 1;

it is apparently pictorial and has been adapted only to the outlines of the zone which it occupies. As may be seen, so far as this fragment extends only one decorative element that is a separate unit, is repeated, and repetition at either a small or a large interval is an indispensable characteristic of symmetrical decoration on a horizontal band. The assumption that the rim is pictorial is not made entirely on the basis of its asymmetrical character, since the design itself is similar to many pictorial representations of reptiles in the conventional form in which they appear on other examples of Aztec art.

The four rim fragments *a*, *b*, *c*, and *d*, in fig. 10 illustrate the

Fig. 10

simplest type of symmetrical decoration on a horizontal zone. The first, *a*, consists of five parallel bands finished off by a scallop. This type of rim design is frequent on the interior of vessels of this group, that is Type 1 *a*, as may be seen by comparison with fig. 2 (p. 23). The second, *b*, is more complex. It consists of a scallop which has become a wavy line, four parallel lines, and rays applied in a manner suggesting a fringe. This type of rim finish is more characteristic of the inner and also outer rim decorations of Type 1 *b*. The rays in this case are each treated as a separate motif. Fig. 10 *c*, is related stylistically to fig. 10 *b*, but here the rays become simple lines which are even more suggestive of a fringe, whereas the scallop is more carefully delineated; thus there are two parallel bands each of which is made up of the repetition of one motif.

More complex compositions appear on fig. 11. The first, *a*, may be considered either as parallel bands of simple separate motifs repeated, or as a repetition of a single complex motif which is treated as one. Parallel bands appear only at the bottom of the design, and the fringe or ray idea is thus carried out. In fig. 11*b*, two motif-nuclei have been used, repeated alternately, and arranged in parallel zones. In fig. 11*c* and *d* three motif-nuclei have been

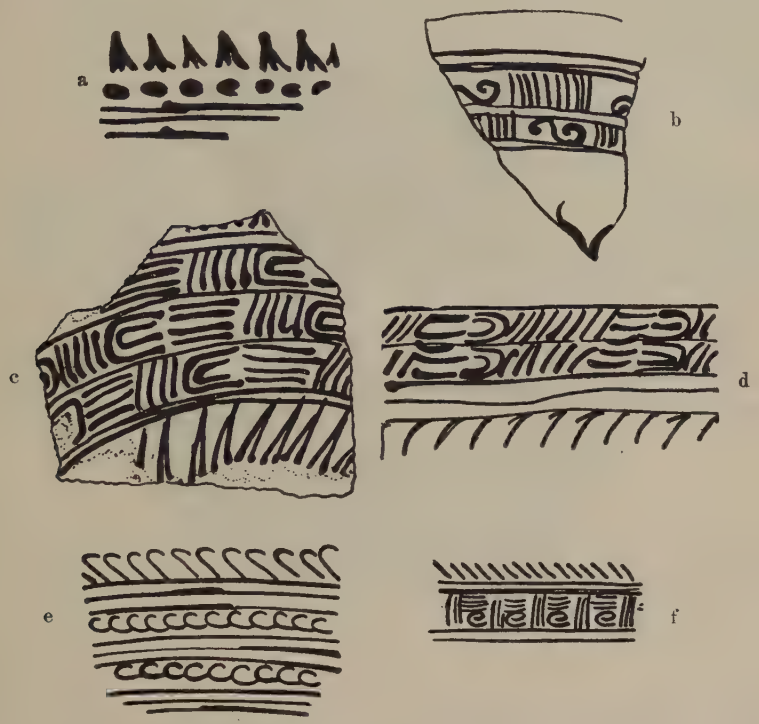


Fig. 11

used, repeated one after the other, and arranged in parallel zones. Fig. 11*e* has probably been made more complex by calligraphic influence since the designs at the top are similar to the two rows of joined semicircles below. The design consists of three parallel bands, the two lower ones of like form. In fig. 11*f*, the horizontal zone is divided vertically by motif-nuclei of three vertical lines, and subdivided horizontally by the complex motif of a short spiral and three horizontal lines. The arrangement may be considered either as an alternation of two motifs, one simple and one more complex,

or as an alternative splitting of the zone horizontally. It is finished off by a fringe, in this case deliberately calligraphic, that is, oblique.

Fig. 11*f* presents a simple example of a type of rim composition that is frequent on Culhuacan ware. It consists of an alternating or partial sub-zoning of the area horizontally, in addition to the vertical subzoning common to decorative compositions on a horizontal area. This is accomplished by means of separate motifs,

Fig. 12

either simple and repeated, or alternating by twos, threes, and greater numbers. This trait of horizontal subzoning is illustrated in its more complex, and also more frequent, aspects on fig. 12*a* and *b*. On *a* the subdivision is made once in one horizontal band; on *b* the subdivision is made alternately in two horizontal bands, and these divisions in turn alternate with each other vertically. It is interesting to note that here again, the most complex composition occurs in association with freely treated, and apparently slovenly, delineation of the design. In most cases the subdivided portion of the zone is delimited on the left by a double curve, as in *b*, or sometimes by a double spiral, as in *a*.

Finally we will consider the relations between the compositions on two or more adjoining bands of designs on the rims. As has been

shown, these horizontal zones are often subdivided into clearly separated smaller horizontal bands. The simplest formal relation between such bands is, paradoxically, no relation at all beyond an accidental one. An example of this is fig. 11*e*. Such lack of relationship between the separate motifs is most likely to occur in cases such as this, in which the design of each band is made up of the repetition of one motif. It has been seen, however, that although no relation exists between the designs themselves; in other words, although there is a lack of formal symmetry, spatial symmetry exists in part by the alternation in vertical order of similar and theoretically identical bands. In fig. 10*d* an attempt is made to place the scallops directly below each other, in the simplest type of vertical formal

a b

Fig. 13 a, b.

correspondence, and vertical spatial symmetry is made by alternating a row of scallops with a simple line.[1] It is worth remarking that the same tendency of treating parallel horizontal bands as entirely independent units appears in basketry, for instance among the Tlingit.

Spatial and design symmetry, alternating on a vertical, is illustrated by fig. 11*b*. The two motifs which are used alternately on each horizontal band, are identical, and bear the same spatial relation to each other as, for example, the squares in a simply woven basket. The same kind of composition, with three motifs, occurs in fig. 11*c*. Here each motif is seperated by two others, on the horizontal band, and corresponds to the identical motif in one row, exactly as in fig. 11*b*, but in the row on the other side the identical motif is one space removed. Unfortunately the shard is not large enough to show what was the relationship of the fourth row at the top to the other tree, but if the composition was carried

[1] This specimen seems to be the part of a bottle-shaped olla just under the neck.

out symmetrically, each motif would correspond to an identical motif, on a direct vertical, across two rows.

In fig. 13*a* series of designs formally identical are separated by a simple line, which in this position loses its importance as a separate decorative element and becomes merely a line of demarcation between the two decorative bands. In fig. 13*c* the composition is symmetrical in a manner similar to fig. 10*d*, though here the number of elements is greater. The four bands visible on the fragment are each composed of more than one element, repeated at regular intervals. Each of the rows alternates vertically, and the designs in them correspond fairly well vertically, across

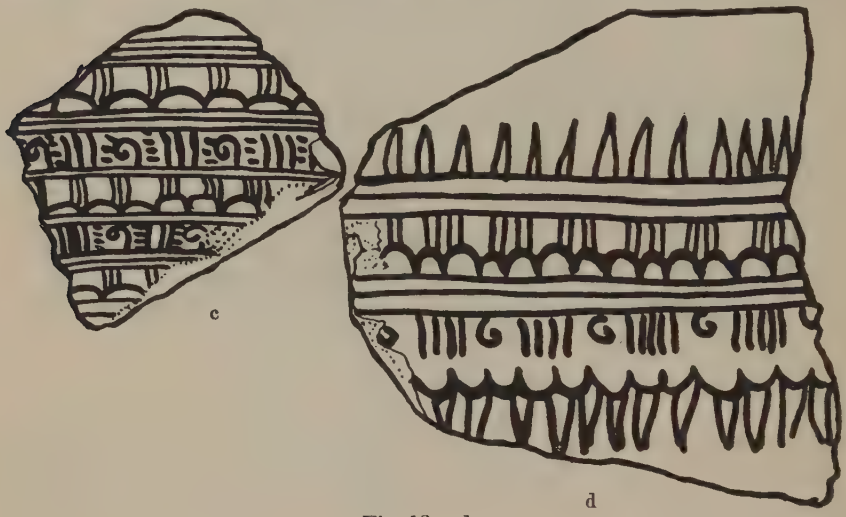


Fig. 13 c, d.

the intervening row. The design symmetry is slightly disturbed, partly by the smaller space available at the lower part of the rim, and partly by calligraphic influences. Each row is separated from the adjoining row by two or more parallel lines. It is not possible to tell from this fragment completely how these parallel lines were related to each other, but it may be seen that there are two lines on either side of the middle row, and above and below the adjoining rows, three; above the top row, four, and, it might be presumed, four at the bottom.

In fig. 13*d* design symmetry is disregarded. This fragment is a good example of a complex composition the elements of which are related only by partial spatial symmetry. The rows of parallel lines are separated by one decorative zone consisting of scallops with

lines. The bottom row of scallops with lines is not identical with the upper one, and between the two an extra decorative zone is introduced, thus accentuating the bottom fringe. However, a fringe or radial edge has also been added to the top. This destroys the characteristic trait of a fringe or row of rays only at the outer edge of the design. Such partial symmetry is a characteristic feature of Aztec design and will be discussed later.

The partial splitting of horizontal zones has already been pointed out in figs. 12*a* and *b*. The relationship between the designs in the whole and in the divided zones, is interesting. In *a* the designs correspond formally, on a direct vertical, where the zone is maintained as a whole, and alternately, on a vertical where the zone is split. In *b* the composition is much more complex. In each of the two separate horizontal zones, the designs theoretically correspond on a vertical, wherever the zone is maintained as a whole. These separate designs are often joined together, so that the vertical rows of designs become single vertical designs. Where the zone is split, the designs above and below the line have no relation to each other, but in turn the designs below this line are formally identical with those designs in the adjoining horizontal zone. The relationship between the two separate bands is established by symmetry of space and design. The designs in the undivided zones of the two rows are identical, and correspond alternately in the upper and lower zones. This relationship is also established between the designs in each of the divided zones. Thus the entire composition must be regarded as two horizontal bands with alternating groups of designs in the upper and lower band, and with the same type of alternation in the divided zones.

The calligraphic changes in the forms of the motifs in fig. 11*d*, have already been touched upon. The composition itself, however, has also been influenced by the motor factor, as the designs which theoretically correspond formally and spatially directly adjoining each other on a vertical, still correspond symmetrically, but on a diagonal. This change is due to the slant given to the design when the movement of the hand is allowed to dominate. The acceptance of this element, and its incorporation into composition as a stylistic trait, may be seen in fig. 13*b*, where the designs are deliberately arranged on a diagonal, and the lines carefully made oblique.

Another example of the incorporation of a trait of calligraphic origin occurs on the rim of fig. 14. The intrusion of vertical or oblique lines into the adjoining decorative zone, as a result of the relaxation of control over the natural movements of the hand, has been seen in fig. 7 (p. 27). There the lines were allowed to enter

Fig. 14

Fig. 18

the adjoining zone in an irregular manner, that is, they did not all stop at the same horizontal line. In fig. 14 such intrusion has been used as a stylistic trait, with the result, that the same vertical lines function identically in two adjoining decorative zones. This arrangement coincides with a lavish use of split decorative zones, so that the two rows are simultaneously also one. The dividing line was apparently made first, so that the entire zone was conceived first as two, and then, by a combination of the tendency to intrusion and the habit of split single zones, was treated as one.

It has been seen then, that the calligraphic freedom which is the result of work done with speed and little attention to the exact delineation and spacing of the designs, gives the decoration a hasty and unskilled appearance. Nevertheless it does not interfere with the complexity of arrangement which is a trait of highly developed design, and, in fact, increases this complexity and gives rise to new stylistic traits. It is desirable to see now in how far and in what ways the same conditions of work affect the designs themselves.

II. Design.

The usual distinction between representational and "geometric" design cannot be applied to the decoration of Culhuacan ware, nor, indeed, to Aztec decoration as a whole. The reason for this is that Aztec representation very early assumed a highly conventional or "stylized" character, so that a drawing which to an Aztec would be the picture of a serpent's head, to us seems often merely a decorative design. In their most highly conventionalized aspects, many of these pictorial representations become hieroglyphs; though it should be added that other hieroglyphs are phonetic, that is, not directly representative of the idea, and still others are made up of simple combinations of lines and curves for which there is no reason to assume in every case, a representational origin.

On the other hand, the same simple elements which are combined for pictorial representation, are used in decorative designs, so that it is impossible clearly to distinguish between the two, and indeed, in many cases a pictorial representation conforms so exactly to the symmetrical requirements of decoration, that it must necessarily be consideerd both pictorial and decorative, but not precisely in the sense usually meant by these designations, since pictorial would not necessarily mean realistic, and decorative not necessarily devoid of representational intent. Furthermore, both pictorial and decorative designs even when they can be clearly differentiated, are "geometric" from our point of view, since the conventionalization apparently preferred by Aztec artists was deliberately nonrealistic, but was assembled in a thoroughly artifical way from simple elements which are "geometric" from our point of view, and which as a rule were preserved as separate elements by means of exceedingly rigid spacing.

The number of these elements is limited. It has been reduced to seven by Adolfo Best-Maugard[1], the first five of which (the spiral, the circle, the half-circle, the S-curve, and the wavy line) are curvilinear; the sixth is the zigzag and the seventh the simple straight line. However, the number of angular elements could and properly should be increased by the rectangular grecque analogous to the spiral, by the rectangular stepped design anal-

[1] Tradición, Resurgimiento y Evolución del Arte Mexicano.

ogous to the S-curve, and by the ray, analogous to the half-circle, since these angular motifs are used at least as frequently as the zigzag, and apparently too, as often as any of the more elaborate curvilinear elements mentioned. Furthermore the dot and the dash are also favorite motifs. The reduction of Aztec design to seven elements only, would therefore seem arbitrary, and it may be that the twelve mentioned do not comprise a complete list, but at all events these twelve are the principal motifs used.

It is a curious fact that the predilection of Aztec artists for artifical forms did not lead to the emphasis of a particular kind of artificial form, such as, for example, curvilinear or rectilinear designs. Examples of any but the simplest designs which are composed of exclusively curvilinear or exclusively rectilinear elements are rare. This apparently balanced use of both of the only two possible artificial lines gives Aztec design a peculiarly vigorous and complex character. Its complexity is further accentuated, as has been pointed out, by the tendency to preserve elements as separate motifs, punctuated, as it were, by spaces. Best-Maugard has described this characteristic as an extreme aversion to crossing, and even to joining, the lines of adjoining simple motifs, except in representations of crossed things, such as, for example, some weaves. His description should be qualified by stating that this aversion exists, strictly, between dissimilar adjoining motifs, since simple similar motifs are often combined into continous friezes.

The design on Culhuacan ware departs from the normal typical Aztec decorative style in two respects. First, in its predominant use of curvilinear forms, without, however, completely discarding rectilinear elements. It may be easily guessed that this increase of curvilinear forms is due to the relaxation of control necessary to make forms with more than one angle, in favor of greater speed. Thus the rectilinear elements which do appear in Culhuacan design are chiefly simple lines, dashes, rays, and joined rays or zigzags. The second difference between Culhuacan and typical Aztec design is the partial discard of spatial divisions between separate motifs, both similar and dissimilar. The intrusion of lines of one zone into another which is an example of this tendency as the result of calligraphic influence has already been illustrated, and other examples will be discussed later. However, spatial distinctions between motifs have by no means been entirely abandoned, and it is evident from previous illustrations that the Aztec concept of a design as an assemblage of separate and separable elements is retained by the potters of Culhuacan. The manner in which the

continous motifs are used in vertical relation to each other on the rim fragment fig. 13*d* (p. 34), will afford a simple illustration of this tendency, as it will be seen that scallops are combined with vertical lines and with rays, and rays in turn are combined with scallops and with a straight horizontal line.

It is necessary to keep this concept of design as an assemblage of separate and separable motifs in mind in order to trace the first type of design-change which will be discussed, namely, the changes made by adaptation of a complex design to decorative zones of a specific form, since it is this concept of design which gives Aztec art its characteristic flexibility, and admits of transfer of designs between widely dissimilar forms and media. It has been remarked that such transfer is extremely frequent in Aztec design, to the degree that it is impossible to determine specific individual design-prototypes.

1. Adaptation of Designs.

Changes in design occur in all types of art whenever a design is transferred from one form to another, and certain of these changes are common to all such processes, as, for example, horizontal elongation and vertical contraction of a design when adapted to a horizontal zone, and semi-circular or completely circular curving of the design-outline in adaptation to a circular form, and finally the linear simplification of complex designs adapted to a small zone. In Aztec art the adaptation of design from a zone of one form to one of another form, is accompanied by two other changes encouraged by the peculiar character of Aztec designs. These are, the elimination and addition of simple elements which have been usually treated as separate forms, or which, even when joined to other forms, are considered as separable. This type of change is not peculiar to Culhuacan design, but it is not less characteristic of it than of other Aztec decoration. It is necessary to describe it in order to determine the changes which are peculiar to Culhuacan design.

a. Centers.

It has been seen that the compositions of the central designs on Culhuacan shallow vessels are not always completely or even partially arranged in accordance with the requirements for symmetrical decoration within a circular zone, and it has been suggested that such disregard of symmetry is, in the case of many complex designs, due to the fact that these are primarily or originally pictorial. None of the designs heretofore illustrated have, however,

disregarded symmetry totally, since even fig. 1 (p. 23) conforms to the curvilinear outlines of the zone in which it is contained. This does not mean that total disregard of symmetry does not occur, but, due to the fragmentary nature of the material, examples of it have not been found.The best example of apparently asymmetrical and surely pictorial, central design is shown in fig. 15. Unfortunately

Fig. 15

the fragment is too small to admit of definitive conclusion. It is a good example, however, of the type of realism to which Aztec artists were accustomed, and, as may be seen, this is by no means a photographic realism. All of the design-elements which are used to portray the animal may be found as separate decorative nuclei in pictorial representations of various creatures and objects. This will become evident as the analysis proceeds.

Fig. 16 is another example of an asymmetrical central design. It is pictorial, and represents a serpent-head seen in profile, the open jaws at the right, and the crest which often appears on mythological conventional representations of this reptile, to the left, at the top. The lower jaw is missing. If it is compared with fig. 17*a*,

the type of conventionalized serpent profile from which it is derived will be clearer. The latter is a complete serpent profile. Its open jaws are turned to the left, and its decorative crest appears in the upper right hand corner. Fig. 17*a*, is copied from an Aztec vessel in the National Museum of Mexico. It will be seen that the same general composition appears in both figs. 16 and 17*a*, but whereas

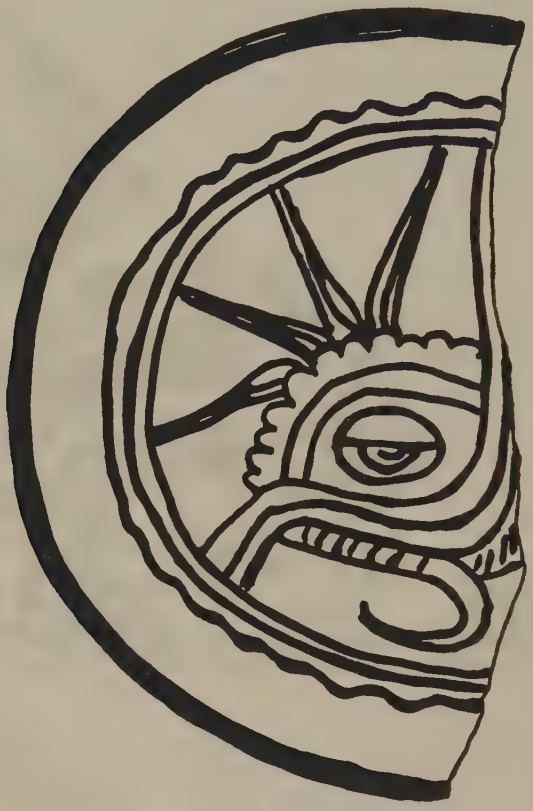


Fig. 16

fig. 16 is contained in a circle, fig. 17*a*, is adapted to a square zone. Even the position of the eye has been changed and laid upon a diagonal line. This same design adapted symmetrically to a circular space, appears in fig. 17*b*, which is also taken from an Aztec vessel in the National Museum of Mexico. Here the profile is duplicated. The design is not symmetrical formally, as a whole, in any one direction. Its important rectilinear elements are symmetrical vertically and horizontally, and its curvilinear elements have been

a

b

Fig. 17

given a rotary movement of the "swastika" type discussed before. It is interesting to observe that fig. 16, which is freely treated, assumes a more realistic aspect.

The central design of fig. 18 (see p. 36), while still suggestive of a picture, is further removed from representation than that of fig. 16. The double curve on which it is based, is laid radially, but from a point a little below the center. The approximate center itself is marked by a small circle. The upper half of the design is symmetrical, vertically, but the lower half is not, since at the left is an extra scroll. The basic curve of this design is frequent in the central compositions of Culhuacan vessels, and furthermore occurs frequently in Aztec pictorial and decorative art. Some of the various aspects of this curve are shown in fig. 19. This will show that the same curve is used for both realistic and extremely conventionalized representation, and no symbolic relationship between all these forms need be assumed. It is also unnecessary to assume a pictorial purpose for fig. 18. The design may be seen as a whole, as similar in idea to fig. 19*a*; that is, a reptile head seen both from the front and in profile view. This type of double perspective is frequent in Aztec design. However, fig. 18 cannot be rigidly so interpreted. Assuming that the rays are meant as a crest, the simple scrolls as fangs, the short vertical lines below the basic line as teeth, and the extra scroll at the left as a tongue, the central petal-like appendage and the other appendage similar to it in form, which corresponds spatially to the "tongue" could not be accounted for. Furthermore the basic line of reptilian jaws as a rule curves upward toward the eye, and inward toward the mouth; so that fig. 18 is a combination and the upper and lower portions might be interpreted as either the inner or outer side of the head. If the lower is the inner, as would appear from the profile view, then the petal or plume-like appendages would properly belong above the eye, since generally such appendages form part of the crest. The design is thus a semi-pictorial, semi-decorative, partially symmetrical decoration.

The same curve appears in fig. 4 (p. 25). Here, however, the pictorial character is still further abandoned, and the design has been more completely adapted to a circular zone by a continuation of the scallops, surrounded by dashes, and by a completely encircling band of rays. It would be interesting to trace the gradual adaptation to decorative purposes of this design, but unfortunately not enough similar complete centers are available. However, the same curve seems to have been retained, though highly atrophied, in fig. 6 (p. 27). Here only the visual suggestion of the curve remains, as the central part has been duplicated and made into a circle,

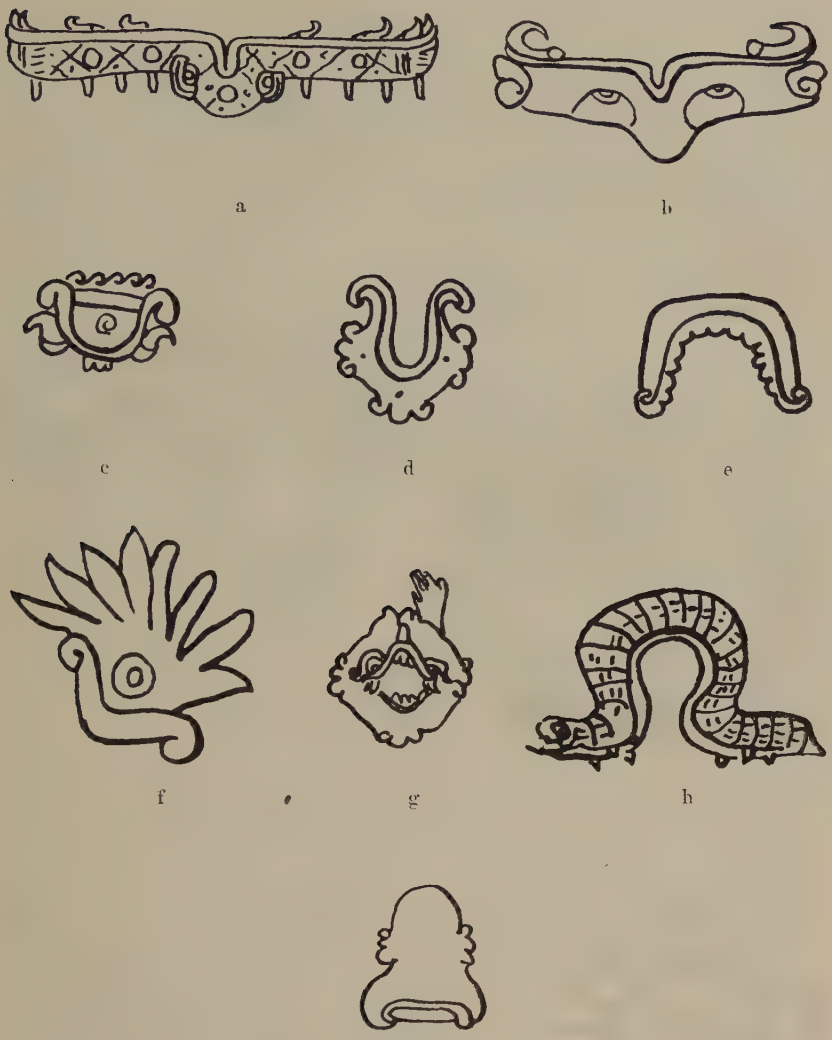


Fig. 19

and the outer scrolls have been separated from it. In fig. 5 (p. 26), the curve has completely disappeared, and has been changed into another form, by duplication. It will be seen that each of the scrolls seems to continue into the central circle, so that the design may be seen either as a duplicated complex curve ending in spirals, or as a circle flanked by double spirals. Here the design is completely adapted to a circular zone.

b. Rims.

The adaptation of representational designs to the decoration of a zone of a specific form may be observed on the rims as well as on the centers of Culhuacan vessels. Fig. 9 (p. 29) has been cited as an example of a design adapted only, by its elongated character, to the outlines of the zone in which it is contained. This design appears to be of pictorial character. Figs. 20 *a* and *b*, may be recognized

Fig. 20

as definitely pictorial. The design represents the head of a monkey, conventionalized in a manner typical of Aztec decoration. Of the head itself, only three features have been retained: the nose, the eye, and the characteristic crest, which in this case, also bears the vestiges of an ornamental headdress. The features retained in the head may be identified in fig. 20*c*, and fig. 20*d* and *e* will reveal that animal heads with headdresses are by no means peculiar to Culhuacan design, are, in fact, extremely frequent in codices, on jewelry, other ornaments, and on ware other than that of Culhuacan. Figs. 20*d* and *e* will furthermore provide a more realistic portrayal of the features which have been stylized.

The use of the upper portion of the head only, in a design to be fitted into a zone vertically narrow, would appear to be the result merely of adaptation to such a zone, in which case the adaptation might be supposed to have been made for the first time on Culhuacan ware, or at least in a narrow horizontal zone on another ware or material. This type of conventionalization, however, was not primarily developed by changing more or less pictorial designs into formal decorations. The portrayal of the upper portion of the head only, is more strictly representational, since precisely this separation of upper and lower jaws occurs through the characteristically Mexican use of animal pelts and heads in costume: the human face is encased between the jaws of the animal, the neck of the animal itself fits around the human neck, the pelt hangs behind, and the upper jaw fits over the top of the head, where, usually, it supplants the human head as a foundation for ornaments, crests, streamers and jewels. In some cases the pelt is discarded, and the head only is retained as a combined headdress and mask, which may be further stylized into only the lower jaw, or only a strip of pelt across the cheeks, and most often, only the upper jaw, with the eye and ears, thus becoming the distinct feature of the headdress, which, nevertheless, is frequently elaborately ornamented. Thus fig. 20*d*, is properly not the picture of a living monkey head, but of a mask and headdress made out of a monkey head. It is evenly cut off around the neck, and, as may be seen, there is an earplug in the ear and an ornament on the crest.

The use of one portion of an original unit as a separate design is in this case based on the actual use of that portion as a separate article of costume; and in this way symbols, as well as designs, consisting of the upper jaw of an animal, bird or reptile, frequent in Aztec art, have doubtless been derived. The upper parts of the heads of a jaguar and a deer, used as headdresses on figures in the Codex Zapoteco and the Codex Zouche respectively, are reproduced

in figs. 21*c* and *g*. These drawings are of interest, since the curve of the jaw is the same in both, although the animals are not. It is also found in less realistic drawings based on the same representational idea. This curve and the semi-circular appendage at its extreme left in figs. 21*a* and *b*, which may be recognized as an animal ear, identify these designs as zoomorphic, derived from

Fig. 21

the upper portion of an animal head. In the case of fig. 21*a*, the semi-circle to the right might be interpreted as either an eye or the other ear; the teeth are represented by three small lines below the curve of the jaw. The eye seems to have disappeared on fig. 21*b*, or rather, it seems to have been elongated in order to correspond to the other elongated appendage, which may be supposed to be an antler; frequently the deer's antlers appear set unrealistically far forward on the head, but frequently too, such an appendage appears on animals which do not seem to be deer, as for example in fig. 21*f*, which is coloured like a jaguar, and appears to be meant as a jaguar, in spite of its similarity of contour to other drawings which are more recognizably deer heads. It is difficult in many cases to differentiate between a jaguar, a coyote, a hare, and a fawn, especially if the drawing is not coloured. Fig. 21*d*, the head of a hare, is remarkably similar to a fawn head, and the similarity between the jaguar, fig. 21*f*, and the deer, fig. 21*g*, has already been pointed out. However, it is immaterial and not definitely possible to determine the specific prototype of the designs 21*a* and *b*; both are animal heads, and it is more pertinent to the purpose of this study to note the way in which these designs have been adapted to decorative purposes. This may best be seen in fig. 21*b*, as *a* is too small a fragment to admit of analysis. It may first be noted that the design has been treated as a single separate motif, and repeated to form a frieze. The eye has probably been elongated to balance the antlers. The design at the extreme right has itself been elongated, and the teeth have been multiplied to fill the greater space made for them by this elongation. The small circle which appears between the designs on the left and in the middle may be interpreted as corresponding to the almost circular appendage at the extreme right of the curve in the middle design; it has, due to the speed with which the decoration was made, been separated from the preceding curve. Thus on the same fragment, the design is seen to assume different forms, all of which retain a mere visual suggestion of their zoomorphic prototype. The very fact that they have been so flexibly treated would help to determine the conclusion that a picture was not intended, and indeed, it is not necessary to suppose that the decorator himself associated the design in any way with the portrayal of an animal.

By far the greatest number of the designs on Culhuacan vessels which appear to be related to zoomorphic representations are applications of parts of the mythological serpent profile for decorative purposes. And in many of these cases, the pictorial character, in its highly conventionalized but still identifiable form, has

completely disappeared. The design has been separated into several parts which are used as motif-units. In these cases, the decorator certainly attached no pictorial significance to his design. It is doubtful whether he considered his elements parts of a pictorial design, for the same linear forms are used in many different ways for either representative or purely decorative purposes. Furthermore it is noteworthy that the curve typical of serpent-head profiles in Aztec art appears alone and purely as a design-motif in the decoration of archaic pottery in the Valley of Mexico, so that its zoomorphic association may have been secondary. It is, however, possible to suggest the relation of this and other linear forms to specific pictorial forms by means of the associations between groups of design-nuclei that are repeatedly found together in formations recognizably pictorial. Nevertheless these "serpent-profile" rim decorations vary widely, and it should be understood that their identification as such, is at best presumptive.

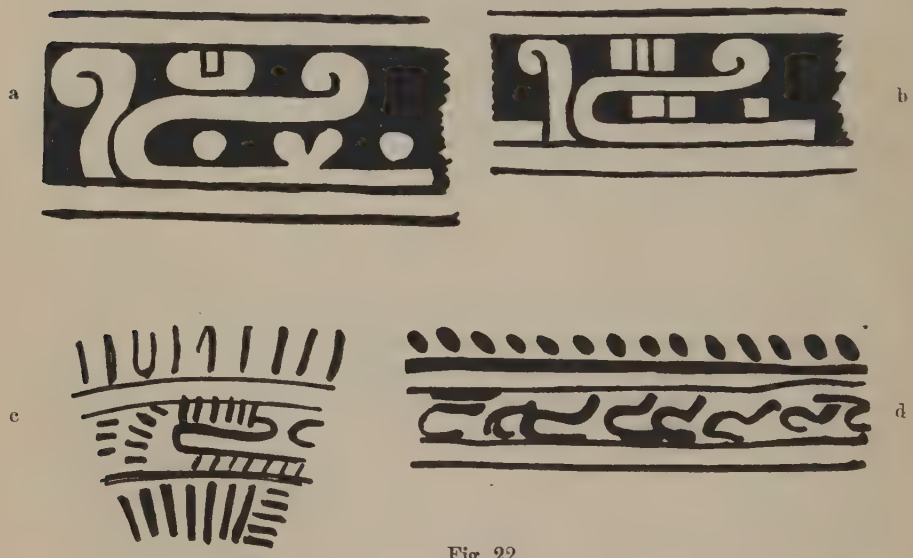


Fig. 22

The conventionalized serpent-head profile, complete, and in typical decorative design, may be recognized with certainty in figs. 22*a* and *b*, which are taken from Aztec vessels in the National Museum of Mexico. These designs are treated as simple motifs arranged in friezes, and are therefore adapted to the decoration of the zone in which they appear, but they have a pictorial intention and value, though not a symbolic one. There is no reason to

assume that the use in decoration of a representational design, necessarily deprives it of pictorial character, as such use is analogous to the arrangement in friezes of any pictorial design, whether conventionalized or realistic, and the simplest example of such a frieze would be a frieze of human figures, which occurs in Aztec art as well as in many others.

The profile in figs. 22*a* and *b*, appears, as has been said, in typical form; that is, it is composed of all the elements which are usually retained in the stylized or conventionalized serpent-profile: the basic curve, starting with a scroll at the top, represents the open jaws; the scroll in the back, the crest; the flattened circle over the basic curve, in *a*, the eye; the two small joined appendages, on the lower jaw, the teeth; and the circles, the fangs. In fig. 22*b*, the basic curve appears, likewise the crest; the eye has been changed into an angular form made up of short vertical lines, and the teeth have been similarly changed into rectangular forms. This change is a further adaptation to the narrow horizontal zone in which the design is contained, since thus, except for the two scrolls and the shallow curve of the jaws, the design has been made into a play of horizontals and verticals.

The habit of considering a design, pictorial or otherwise, as an assemblage of separable and separate forms, may be seen operating in the manner in which the serpent-profile is used for decorative purposes in Culhuacan ware. One of the most frequent divisions made is the separation of the upper portion from the lower, that is, the retention of the upper jaw, eye crest, and teeth, as a motif, and this division will be comprehensible in view of the analogous divisions which have been observed in the case of other designs consisting of a zoomorphic head. However, that is not necessarily the only division possible. The retention of the basic curve itself, and the discard of the crest, also occurs, as seen in fig. 22*c*. Here, certainly, there is no pictorial intention. The design is used simply because this curve is familiar, in serpent-profiles and otherwise, to the decorator, and, as has been remarked, its use as a design may antedate its pictorial use. The eye and teeth have here become, for decorative purposes, formally identical, somewhat as in fig. 22*b*. The number of lines has been increased. The crest is discarded, but the body of the serpent is reminiscently represented by the small semi-horizontal dashes to the left of the design, which, in pictorial designs, appear elaborated into rows of plumes. In fig. 22*d*, it may be presumed, only the basic curve which in more elaborate designs often represents the open jaws of the serpent is retained as a motif. It is surely impossible to be certain that the

serpent-profile is the prototype of this extremely simple design, and yet the curve itself, which is a complex one, is usually associated with the serpent-profile, so that it may, at least theoretically, be considered as one possible final decorative simplification of this design. The characteristic point is the omission of all the forms usually associated with the curve, and its use without them as a complete decorative unit. This type of change cannot be ascribed, except indirectly, to the conditions of rapid manufacture under which Culhuacan ware was made, since separation of complex designs and simplification into fewer elements occurs throughout Aztec decoration, without reference to specific conditions (figs. 22 *a* and *b*). Furthermore the basic form of the line, as has been noted, is not changed by having been made so rapidly. Such changes occur with other examples. These will be discussed later. This process of simplification by elimination operates also in the elaboration of symbols; for symbolization in graphic art is as a rule produced by the representation of a complete object by means of one or more of its parts. In figs. 22 *c* and *d* the same process occurs without pictorial intention, and as the result of a purely graphic principle of decoration, namely, the habit of employing complex designs as an assemblage of separate, separable parts.

The serpent-head profile design has been broken in a familiar way in fig. 23 *a*. Here the lower jaw has disappeared; and its place has been taken by the inner circle which separates the center from the rim. Thus this line in a sense, insofar as the principal rim design is concerned, joins, instead of separating, the rim and the center. The lower jaw may be considered then, either as discarded, or as coincident with the inner circle, in which latter case this coincidence would represent an adaptation to the decorative requirements of the circular vessel. Most of the rest of the typical design-complex is retained: the crest, the upper jaw, the eye, and the molar teeth. That the portrayal of a serpent was not intended, moreover, may in this case be proved, by the juxtaposition of the rows of curved elements to the principal design, for these elements would, in a representational drawing, properly appear at the left of the design only, that is, behind the crest, since they correspond to the plumes of the body. Here they appear to the right of the design, that is, in front of the open jaws. It is thus clear that the elements which pictorially may be assembled into a conventionalized snake, are here separated and used purely as designs.

In fig. 23 *b*, the basic jaw curve may have completely disappeared. The design is made up of the eye, which may still be recognized as a conventional eye, due to its curved character, and the teeth, which

are made angularly, and are separated from the eye by a curved line corresponding in form to the curve of the eye itself, although it is possible that the broken end at the right may have continued in the upward curve of the serpent motif. To the left

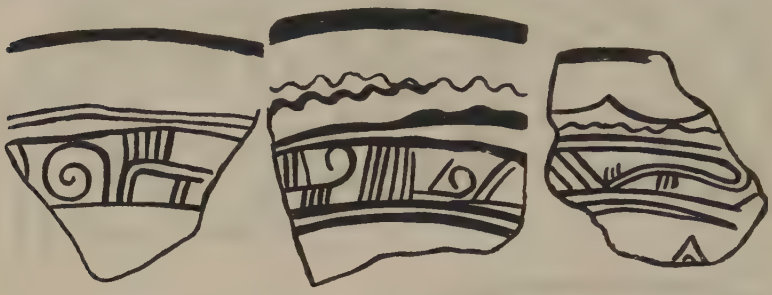
Fig. 23

appears a curved appendage which, in a pictorial representation, would correspond to a fang. The scroll at the left of this design is unfortunately on the edge of the fragment, and its relationship to the design can therefore not be determined, since its position would make it arbitrary to suppose that it corresponds to either the crest or the scrolled end of the upper jaw.

The curved eye is retained also in fig. 23 *c*. In other respects this design is even farther from the pictorial designs which employ the same and similar elements. This eye is separated from the teeth by a curved line, scrolled upward at the end, coresponding to the upper jaw, but enclosed in still another scroll which is connected with the continuous rim line. Furthermore this outward scroll is

followed, to the left, by straight vertical lines repeating, on a larger scale, the formal idea of the teeth, but to which a representational character could hardly be ascribed. It has been observed that such duplication of a motif is a frequent decorative expedient in the composition of designs along a horizontal line.

The transformation of the eye into vertical lines, and as a whole into an angular form, which appeared in fig. 22*b* (p. 50), where the design retains a pictorial character, reappears in figs. 24 *a*, *b*, and c,



a b c

Fig. 24

which are not pictorial. The change is the same, however, in the pictorial as in the non-pictorial designs, and it is a change made for decorative purposes, that is, is essentially a repetition of a motif. In fig. 22*b* this repetition is not clearly horizontal, since, instead of being completely separated in the manner of succeeding elements of a series, the upper lines in part overlap spatially the lower lines. In fig. 24*b*, this overlapping occurs, slightly, on the design at the left, but in both figs. 24*a* and *c*, the two rows of lines are separate. In *a*, they correspond alternately, across the dividing line; in *b*, partly only; in *c*, they correspond alternately but across a diagonal, so that they almost continue each other on a horizontal plane. The "crest" has been completely separated from the jaw-curve in fig. 24*a*. It is impossible to determine, beyond the fact that the lower portion of the curve has been discarded, in what way the line was completed. In *b* the design at the left retains the jaw curve, which separates eye from teeth and ends in a scroll. The vertical lines have been repeated to the right of this design, that is, in front of the supposed jaw, as in fig. 23*c*. To the right of these lines the design appears completely changed. The scroll breaks off at one of the vertical lines, and above it only one line is made. The lines to

the right, like this single line, are diagonal, unlike the other lines which appear on this fragment. A clue to the change in this fragment may be found in the treatment of the lines above the entire horizontal zone. It will be noted that the uppermost of these lines suddenly diverges from the path parallel to the lower, which it has previously followed. Furthermore the heavy wavy line above breaks off abruptly at this point of divergence, and a thin wavy line is carried off from it, which in turn is really part of another thin wavy line which has appeared above the heavy one before. This sudden displacement of the design is surely due to the fact that the decorator shifted the position of the plate, and renewed his design with his hand in a somewhat changed relation to the vessel. Hence the divergence of the uppermost line, which by the thickness at the point of divergence, would seem to have been started too high, and then joined by later brush strokes, to the lower line. It will be seen that the diagonal lines at the extreme right start from another line, which in turn starts from the base-line of the design. This line, it would also appear, was started too high, and was then joined to the lower line, which is in reality composed of two lines, like both the heavy ones above, and the one below it. This duplication of the lines may or may not have been made after the displacement of the design at the right, in order to correct this displacement in some part, as it appears was done with the most divergent of the lines. It may, however, be concluded, that the diagonal position of the lines to the right of the scroll is due to this shift in position, and thus a new element has been introduced, which is the result of rapid workmanship, influenced by the mechanical movements of the hand.

This diagonal position of lines which have appeared as vertical, seems to have been accepted in fig. 24*c*, as a stylistic element, in the same way as in the center fig. 7 (p. 27). Here the diagonal is deliberately made. The jaw-line has been joined at the top to the continuous line which contains the zone, and at the bottom it breaks off against the diagonal lines. The short vertical lines have been kept approximately vertical. The design thus produced is a very complex arrangement, for to the play of horizontal and vertical lines usual in rim decoration, a diagonal element has been added, and the additional complexity of the curve has been retained, but amalgamated to a horizontal line. The pictorial element has completely disappeared, and the design has taken on the character of a complex abstract composition, hastily made.

The tendency to duplication of forms made similar for decorative purposes seen first in fig. 22*b*, and then in figs. 24*a*, *b*, and *c*, occurs

in a more elaborate manner in figs. 25*a*, *b*, and *c*, and *d*. In fig. 25*a*, the entire design, except the lower jaw, has been retained. The jaw-line has lost its upper scroll, as in fig. 24*c*, and there is a similar tendency to amalgamate it with the adjoining horizontal line. This design, however, differs in one important way from those

Fig. 25

which have preceded. It appears upside down. It has been seen that the basic line usually curves upward, and that the adjoining scroll likewise starts upward. Here the opposite occurs in both cases, if the plate is seen from the center outward. However, if it is seen from the rim towards the center, the design appears in its usual position. This change may of course be imputed to whim,

but it is possible that it was determined by the desire to finish the decoration while the paint was still wet in the center, in which case the rim would have to be decorated from outside in, so that the hand would not be in danger of rubbing or touching the decoration of the center. This hypothesis is strengthened by examination of the short vertical lines which appear above and below the curved basic line in fig. 25a. The innermost of these lines tend to overlap the central curve, and the outermost the adjoining line. Some overlapping occurs in the other direction, but this is probably due to the fact that the innermost circular lines were made first. Furthermore some of the innermost lines do not touch the adjoining horizontal at all, and at the extreme left, the outermost lines blur at the top. These things could well indicate that when the rim was decorated, it was seen, and decorated, from the rim inwards. In this design, a row of joined semi-circles appear to the right of the crest, that is, in the place where they would appear if the head were to be continued into a plumed body. The basic curve of the design has been adapted to the zone by elongation, and the disappearance of the uppermost scroll has also emphasized this adaptation. The duplication of the short vertical lines would perforce follow; but it is impossible to determine whether the line was elongated to accomodate this duplication, or whether the duplication occurred because of the elongation.

In fig. 25 *b*, the elongated central line has been made strictly parallel to the lines enclosing the zone. If it was discontinued, the design would have been a clear example of a "split" decorative zone. The short vertical lines are again duplicated alternately, but they differ in number. Longer vertical lines continue this duplication, but across the entire zone, thus emphasizing the "split" arrangement. This design appears on the outside of a shallow bowl. Like fig. 25*a*, it is "upside down", if the former usual position is accepted as the normal. However, in this case the position is deliberate, and not, as is proposed in the case of *a*, the result of hasty workmanship. If this design was applied on the bowl with the bowl upside down, the design was seen in its habitual position, as it was in fig. 25*a*, if it was applied with the hand outside of the vessel, as has been suggested.

The tendency to make the central curve strictly parallel to the enclosing lines on either side seen in fig. 25*b*, occurs again in fig. 25*c*, and the only portion which has been retained as a curve, is joined to the horizontal enclosing line, as in *b*. The vertical lines have been increased, but again with a slight difference of number. The crest has been discarded, but the same formal element has been used, also in duplication, to correspond alternately in the same way as

the vertical lines, though dissimilar in number. This type of composition recalls fig. 12*a* (p. 32), where the zone is similarly split. In fig. 25*d*, the zone is also split, but here in a somewhat different way. The central curve, in part elongated and parallel to the enclosing lines, and in part curving toward them, has been itself duplicated. The two curves correspond vertically, and the short vertical lines correspond both spatially and formally on a vertical line, since here they appear to be equal in number. These changes in design, produced through the adaptation of a complex motif to the decoration of a horizontal zone, may cast some light on the split compositions heretofore discussed.

The analysis of the "serpent-profile" design will be concluded with an examination of a highly suggestive decoration, fig. 26.

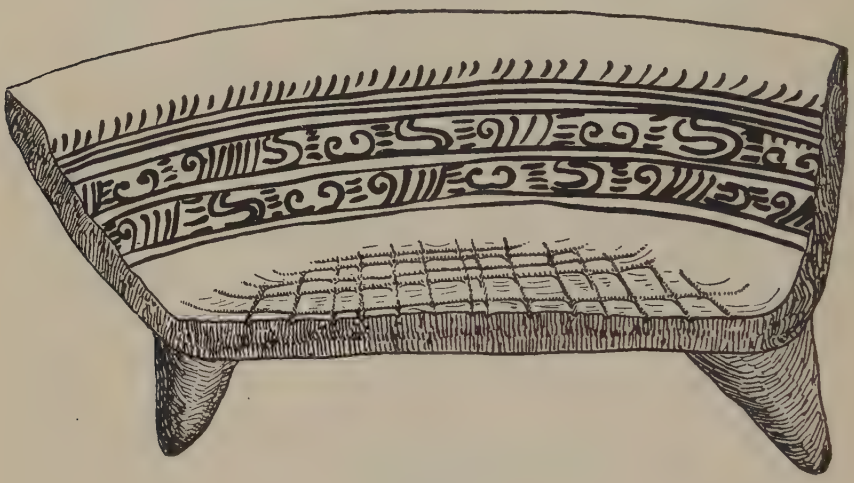


Fig. 26

The two rows are decorated with identical forms, but bear no relation to each other, so that it is not necessary to examine both. The most complex motif, that is, the association in one group of the greatest number of dissimilar forms, occurs at the left of the vessel, on the upper row. If this decoration is compared with the preceding drawings, it, will be found that the double curve at the right (the sixth element from the left, beginning with the short horizontal strokes near the broken edge) is reminiscent of the basic curve in the serpent-profile. The vertical lines at the left recall both eyes and teeth, as treated in the non-pictorial version, while the single scroll adjoining, by its position and form recalls the crest.

The short horizontal dashes at the left recall the body plumes, and the double scroll is often, in other drawings of the serpent-profiles, associated with another type of crest; as suggested by fig. 9 (p. 29). It should by no means be understood that the decoration on fig. 26, has a pictorial character even in as shorthand a version as symbolic representations admit. The elements of the design have been distributed along the rim separately, with either a double scroll or a row of horizontal dashes between. Similar designs are not repeated at regular intervals.

We will call the short horizontal dashes 1, the double curve 2, the double scroll 3, the vertical lines 4, the single scroll 5. The order in which these occur in the two rows is

4 1 3 1 5 4 2 1 3 1 2 1 5 4 1 3 1 2 1 3

1 5 4 1 2 1 3 1 5 4 1 3 1 2 1 5 4 2 1 5 4

Evidently 1, 5, 4 belong together. The relation of larger groups is irregular. The association, dissociation, and re-association of elements is a simple illustration of the way in which designs more complex in appearance are separated and put together, for widely varying pictorial and decorative purposes, throughout Aztec design. The habit persists here so strongly that it even supersedes the "natural" impulse to arrange designs along a horizontal row at regular intervals. If the vessel were complete it might, however, be found that the designs are arranged according to an extremely complex rhythm, which partially established and partially discarded spatial regularity.

2. Elaboration of New Designs.

The great variety of ways in which a design complex can be developed by this process of separation and re-association can be clearly seen in the decoration of the edges of the rims, where this great variation of a limited number of motifs is further increased by calligraphic freedom. The decorations on Culhuacan vessels are usually finished off at the rim in one of three ways: by a single straight line or band, by a wavy line or row of scallops, or by a fringe made up of straight lines or of lines converging by twos or threes into rays. All of these three elements are sometimes used, to make a complex rim finish. They may be joined, or two may be joined, or all may be separate. The fringe or row of rays is one of the favorite ways of finishing the rim, especially in the "calligraphic" ware, in which it is seen that the fringe of straight parallel or parallel

curved lines and the rays are essentially the same design, changed calligraphically.

One would not expect to find that such simple forms as a straight line, a semi-circle (either separate or continued into a frieze) and a ray were forms peculiar to Culhuacan design, and the use especially of rays to finish off a circular decoration, is frequent in Aztec design. The semi-circle occurs occasionally in rim-edges on Culhuacan ware, with another and smaller semi-circle within it, or sometimes with a circle, which in turn contains a dot, or a dash, perhaps vestiges of still smaller circles. This form coincides with the form used in representational designs for an eye, but it is characteristic of Aztec design that it represents an eye only in association with the rest of the pictorial elements of a head or a face, since it appears used also in other pictorial designs to represent a petal, a plume, and as part of the design which represents a star. The design elements which make up a star are especially pertinent to a discussion of the rim-finishes of Culhuacan vessels, since they consist of a semi-circle with or without a smaller semi-circle or a complete circle inside, and with or without a still smaller circle, semi-circle, dot or dash inside of it; and two or more, but usually two, lines drawn vertically adjoining, or joining, this semi-circle, and converging to a ray or continuing parallel to a straight horizontal line, or showing some less frequent elaboration. The star is represented by the circle or semi-circle in the form reminiscent of an eye, and the lines whether convergent to a ray or not, represent rays of the star. Two forms of this representation may be seen on fig. 27*c*. In the smaller designs, the eye appears at the end of the ray, and in the larger, the ray starts from the eye. In fig. 27*d*, the design is somewhat changed: the semi-circle continues into two parallel lines, and the inner circle adjoins, but does not touch, two additional smaller parallel lines. Thus it will be seen that even for representational purposes, the design is treated with great flexibility. Fig. 27*e*, is a typical row of rays, identical with rays used for decorative purposes at the edge of rims, here used for representative purposes. Its radial character makes this motive well adapted to a circular zone, and indeed, since it occurs with great frequency on these, it might as easily be considered the result of decoration as primarily pictorial, or it may ce derived from the decoration of vessels intended to be symbolical like those of Cholula.

The elements named, that is, the semi-circle and the vertical lines, are usually found associated in some way on Culhuacan rim finishes of Type 1*b*, that is, more on the ware with the most calligraphic decoration. However, they change in proportion and number

independently; that is: a certain change in the semicircle does not imply only one possible change in the lines, so that no one type of semi-circle is found invariably associated with one type of rays, lines, or fringe. The straight horizontal lines which accompany these two elements cannot, of course, change except to lose their character, that is, to become a wavy line or a zigzag line. In the first case, the change would coincide with another change which transforms a frieze of semi-circles into a wavy line. The relationship of these lines to the two other elements varies in two pricipal ways: they may either enclose the motif, whether it be a fringe or a row of semi-circles with verticals, or they may delineate only one side of the horizontal zone, thus transforming it into a fringe.

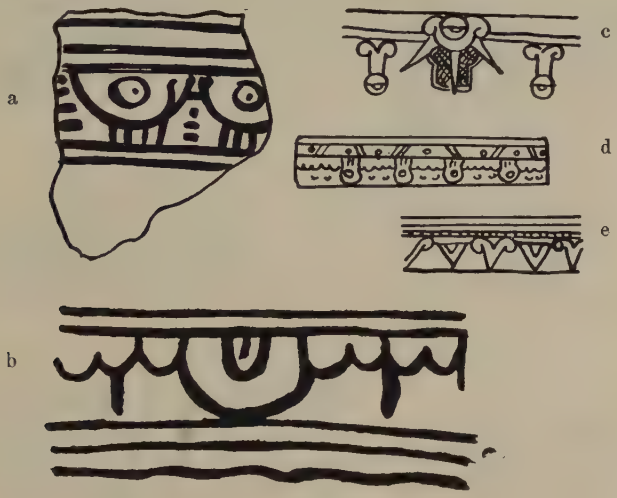


Fig. 27

The design is shown in its most elaborate form in fig. 27*a*, but it should by no means be concluded that this form is either the original prototype, or the final development, of the design-complex. In fig. 27*b*, the design has been somewhat dissociated. The complex semi-circle has been retained as the chief design unit, and is emphasized by smaller continuous semi-circles which make a row of scallops, and upon which, or between which, short vertical lines are placed at slightly irregular intervals. In the middle row of fig. 28*a*, the semi-circle has retained four lines, as in fig. 27*a*, but does not contain the inner circle and dot. The lines are placed directly upon the semi-circle and the motif is repeated to form a frieze, as in fig. 27*a*. In the upper row the two elements have been placed alternating side by side. The number of lines is not the same

in each case, and the semi-circle has been reduced. Furthermore it has been made so hastily that in two cases it was not even closed, and in one case it has nearly become a complete small circle. Both forms which seem to appear here accidentally, are used as regular design elements in association with those already described. The incomplete circle, which may well have arisen in this association through calligraphic freedom, as in fig. 28*a*, is used as a design element on the upper row of fig. 28*b*, and appears likewise in

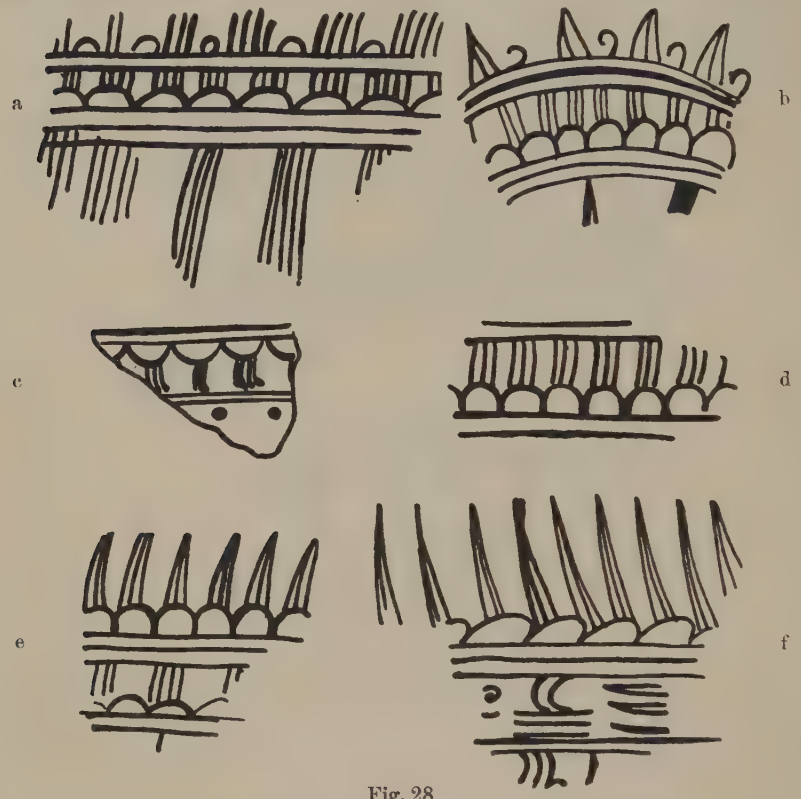


Fig. 28

fig. 13*d* (p. 34). In the lower row of fig. 28*b*, the number of lines is regular, but is reduced to three, and these are placed indiscriminately either on top of one semi-circle or between two. The lines in the top row have also been reduced to three, and converge to a ray, which is clearly marked and deliberately made. In fig. 28*c*, the design is used upside down, on the outside of a shallow bowl. The number of lines is irregular, and they are not rigidly vertical; rather, the fringe idea which occurs on the top of 28*a*, through

calligraphic freedom, is here deliberately produced. In *d* the number of lines has been definitely reduced to three, regularly placed on top of the semi-circles and delineated vertically, as in fig. 27*a*, and fig. 28*a*. In the former specimen the base of the semi-circle rests on a horizontal line, which is repeated twice, and the same occurs in fig. 28 *d*. The number of lines enclosing the design at the top remains the same, but the number at the bottom has been reduced to two, instead of the former three. In fig. 28*e* three horizontal parallel lines are used, in association, however, with semi-circles topped by rays made up of three lines each, placed at regular intervals in the same position. This identical association of elements occurs again in fig. 28*f*, but much changed in appearance. The scallops slant to the right, the rays to the left. This can only have been produced by a change in the position of the hand. The resulting composition made up of opposed diagonals illustrates a change made in a design through calligraphic freedom only.

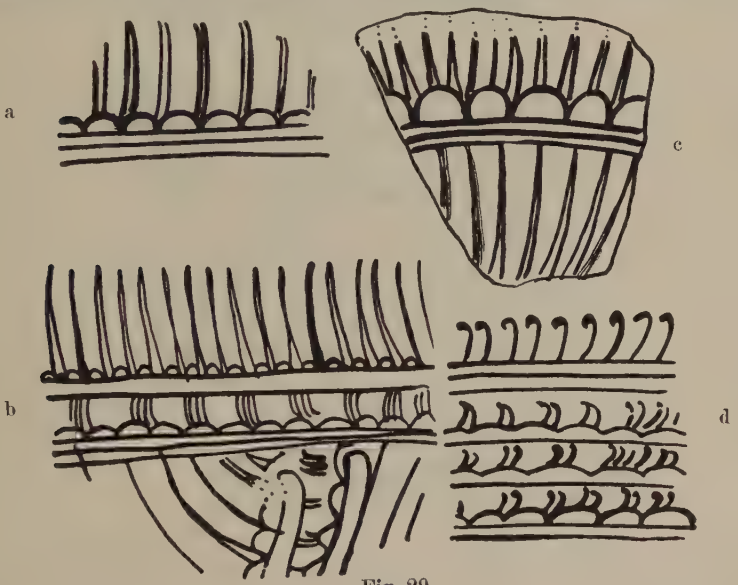


Fig. 29

Further variations of a formal, non-calligraphic character, occur with the reduction of the lines to two. In fig. 29*a*, these two lines are placed at regular intervals, that is, between each scallop, except at the extreme left, where, it may be through force of habit, the lines are placed on top of the scallops. They tend to converge into rays, but do so only in one case. In fig. 29*b*, the lines are made into rays in every case, and they alternate regularly with the

semi-circles, which now appear, necessarily, separated, and also much reduced, whereas the rays have become much elongated. This elongation of the rays is no doubt due to the desire to fill a larger space with a single element, and can thus indirectly be imputed to conditions of rapid manufacture, though in itself this particular change is not due to rapid movements of the hand.

The tendency to place the rays either on top or between scallops has in some cases operated in both ways at once, causing irregularity and confusion, as for example in fig. 28*b*. In fig. 29*c*, the two

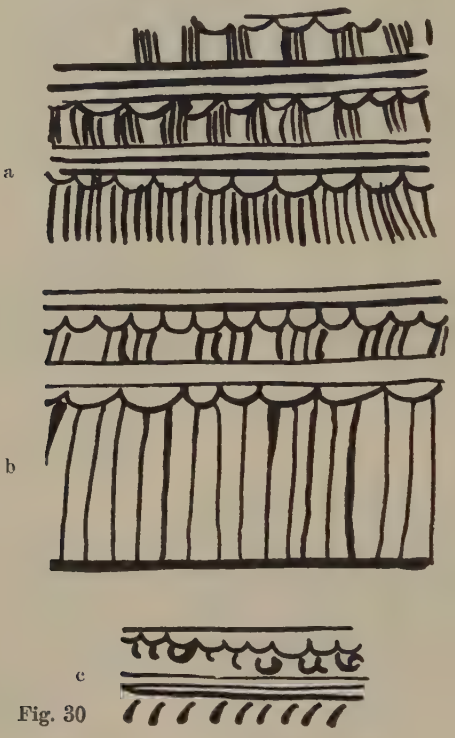


Fig. 30

possibilities are not treated as alternates, but are both employed, and the rays are placed on top of and in between the scallops. This change may also be considered a stylistic result of rapid workmanship, since the displacement in fig. 28*b*, for example, was caused not by a doubt in the mind of the potter as to where he wanted the lines, but simply to the haste with which he made them. In fig. 29*d*, the form itself of both semi-circles and lines has been changed. The semi-circles have been for the most part detached from the horizontal linear base, and have become lines of shallow scallops,

angular below and curved above. The lines upon them have been changed into curves, a still further development of the tendency observed in fig. 28*c*, and since these lines have been started from a dot, as if indeed they were spirals, the spiral form is taken by the single lines at the top. Thus by calligraphic change, the form of a straight line has come to coincide somewhat with the form taken by the semi-circle under calligraphic influence, as was observed in fig. 28*a*. This development has been concluded in fig. 30*c* where some of the vertical lines adjoining the semi-circles have actually, and at irregular intervals, become semi-circles thus showing the accidental character of the change. In the fringe itself, the lines have remained almost straight, but have been given a decided slant. The curved lines immediately under the scallops were made from left to right, exactly in the same direction as the scallops, and thus they approximate the scallop in form, whereas the lines below were made from top to bottom, and thus remained short rectangular dashes, with a typical calligraphic slant.

The number of lines has been reduced to one, in some cases accidentally. In fig. 30*a*, this number has become stylistically accepted. As in fig. 29*b*, the lines are elongated to fill a very wide space. The lines are placed at regular intervals, but without relation to the scallops, which differ in size. Thus the design has become a combination of two motifs placed parallel to each other continuously but without formal or spatial relation. In fig. 30*b*, this idea is still further elaborated, and the lines are placed close together, filling the spaces between the scallops and also the spaces on top, precisely as if the lines represented a fringe.

It has been noted that the design-motifs discussed are frequently associated, so that the association warrants the name of "design-complex". This association is, however, by no means invariable. Groups of parallel horizontal lines occur unassociated with semi-circles, rays, or vertical lines. Parallel horizontal lines with one row of scallops occur in fig. 10*a* (p. 30); parallel horizontal lines with a row of double rays, in fig. 10*b*; and parallel horizontal lines alternating with rows of scallops in fig. 10*d*. The three elements are represented in fig. 10*c*. In fig. 8*a* (p. 29), parallel horizontal lines are combined with rays and with short vertical lines, which have been curved calligraphically. Rays and elongated verticals, either straight or curved, have been found used frequently in the zone between the rim and the center, and also as part of the central design.

The single semi-circle enclosing another semi-circle, with a dash or another circle inside, may also be found used independently, and it occurs in a striking manner in figs. 31 *a*, *b* and *c*, where it

has been made into a floral design, simply by being arranged around a circle, not on a straight line, as on a rim. In fig. 31*a*, the circle is large, so that the floral idea is hardly more than suggested;

Fig. 31

in *b*, the central circle is smaller, and the flower is consequently clearly formed, and in *c*, it is emphasized by the reduction of the central circle and the elongation of the semi-circles into petal forms. In *d*, one of these petal forms has been still further elongated to the extreme of the central zone, and has as a result been narrowed, since it started from a narrow space. It converges somewhat to a radial form, so that by a change of proportion the double semi-circle and the ray made up of three lines may be said to have coincided in form. That the elongated form is really the same might be further urged on the basis of the radial center of the petal to the left, which has

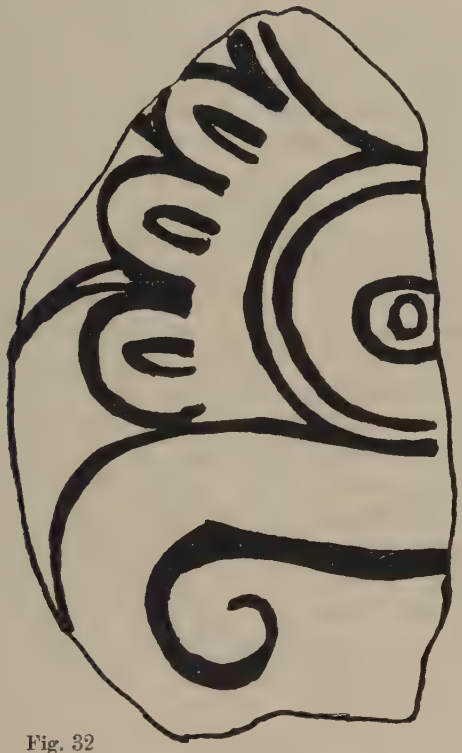


Fig. 32

been changed from a semi-circle or rather, an elongated semi-circle to a ray, by the spatial conditions under which it is made. In the petal to the right, the semi-circle has been discarded and replaced by a dash, as with the innermost semi-circle in *c*, and on either side of the central petal in *a*.

The double semi-circle in two forms makes up a complex design in fig. 32, where it is combined with short rays and, on this fragment,

one scroll. This design appeared in the center of a vessel, and in its complete form was pictorial. However, it is impossible to determine from this fragment what the representation was, since if the design is seen vertically, that is, in the position it has been arbitrarily given on the page, it appears to be part of the head of a bird with a crest, the large inner semi-circle with concentric circles functioning as an eye, and the scroll as a beak; but if it is seen horizontally, the fragment may be seen as a part of a floral design, which was completed by a scroll symmetrical to the one which is still visible.

The double semi-circle with or without a central circle, dot, or dash, has thus been elaborated into representational forms, without the addition of other forms in figs. 31*a*, *b* and *c*, with a calligraphic and spatial change on fig. 31*d*, and with the addition of two other forms in fig. 32 where, however, the double semi-circle in two of its forms makes up the chief part of the design. These two examples of integration should establish that the separation of complex designs into simpler combinations which has been previously traced, is only one direction in which change may proceed, and that the opposite, that is, the re-assembling of complex, and even of representational designs out of simpler non-pictorial motifs occurs simultaneously, not in obedience to any single law of development or degeneration inherent in a design or in a group of ware, but in adjustment to the decorative requirements of zones of specific forms. Another type of change, it has been observed, also may occur simultaneously, on the same design, but in obedience to conditions other than the adjustment of a design to a zone. These influences, which have been called calligraphic, affect both the form and the arrangement of a design, specifically because of the rapidity with which the design is executed, in combination with the particular position in which the vessel or the hand is held. The way in which these latter factors influence the composition of the design has already been discussed, and the way in which they affect the form has been noted in part, but will be discussed more fully in the next portion of this study.

3. Calligraphic Influences.

The influence of the automatic movements of the hand, as opposed to movements consciously and rigidly controlled along a predetermined line and in a predetermined direction, has been referred to as calligraphic influence[1], and it has been found that this

[1] It has been stated that this use of the term is somewhat too general, but lack of a more accurate word forces its use. It is meant to convey the phrase "free handwriting movement" rather than "beautiful handwriting".

influence is exercised most freely on designs which are executed hastily. It should by no means be understood that by "dominance of calligraphic influence" a lack of control is meant; but rather, a shift of control from the mental image to the mechanical movements of the hand, and the differences between designs more or less rigidly controlled by this mental image, and others more directly influenced by the movements of the hand, have been to some extent noted.

It has been found that this calligraphic influence affects both the arrangement and the form of the decoration on many Culhuacan vessels. The composition, on both centers and rims, has been made more complex by an additional element of direction, caused by the slant produced by calligraphic freedom; and another complexity has been noted, namely, a tendency to splitting zones, to some extent corroborated by the calligraphic tendency to introduction of vertical or diagonal lines into adjoining horizontal lines or zones. The calligraphic tendency to slant and curve straight lines has also been found to affect the form of designs, and a tendency analogous to that of intrusion, namely the disregard of spatial distinction established otherwise than calligraphically, will also be found to affect the forms of the designs.

Semicircular forms, furthermore, have been found changed to almost complete circular forms, and also to incomplete semi-circles, that is, to shallow spirals, by the same general influence that changes straight lines to curves, and occasionally into shallow scrolls coincident in form with the scrolls derived calligraphically from semi-circles. Thus it has been seen that rectilinear forms may be changed to curvilinear forms; and curvilinear forms into other curvilinear forms, either shallower or deeper; and finally, curvilinear forms may be changed into rectilinear forms such as the dash or the dot. The degree to which these changes affect the appearance of a design may best be determined by a more detailed examination.

Angular rectilinear forms are infrequent in Culhuacan design as a whole. The following figures (33—35) of Type 2 are included here although they do not belong to the Culhuacan type. They illustrate the influence of calligraphy upon design. The widely distributed terrace or step design occurs in Types 2 and 3, associated with a spiral, parallel horizontal lines, and dots; this characteristic Aztec design-complex appears in fig. 33*a*. In fig. 33*b* the terrace is used as an independent motif, alternating with a small three-sided rectangle. In fig. 33*c* the same design is used alternating with a series of short dashes. The rectangular structure of the terrace has disappeared, because the lines were made hastily and inaccurately. The terrace is hardly more than a rapid zigzag. In

Fig. 33

fig. 33*d* this tendency to make a zigzag of the terrace has been more completely developed, and the lines, though angular in appearance, are not rectangular. Two terraces have been made into a single line, so that the design is not a combination of two designs, but a cross made of zigzag lines. The small circles used together with this design have in some cases been made so rapidly that they have become dots, and they are exclusively dots or mere formless marks, on the border; it is not certain whether dots or circles were intended there in the first place, but in the lower part it would seem that the transformation of circles into dots has actually occured.

Fig. 34 a, b

In fig. 34*a* the terrace appears as a zigzag, to the right, but to the left it approaches more a close row of scallops, since only the upper angle of the zigzag is consistently made; this appearance is probably due to the fact that the line was made with a series of quick single movements, as a line scallops would be made, whereas a zigzag line would be made by slower double movements, which would produce angles at each extreme. In fig. 34*b* the line was clearly made with a "scallop" movement, and the scallop appearance supersedes that of the zigzag and the original terrace. Two of the dots are circles, and it may be suspected that in this case the intention was to make dots, but that they were made by a circular movement, instead of by a single touch of the brush, since the making of a clear round dot requires great care and consequently lessens speed. Some of the dots appear, however, to have been made in this fashion, but hastily, so that they are not circular, but have an irregular form. The terrace in fig. 34*c* has become frankly a line of scallops, still shallower than in *b*. The line was made with a "scallop" movement so rapidly that at one point a loop appears. In fig. 34*d* the loop appears throughout, and the line has been changed into a series of continuous loops, which is an easier one

to make, and can be made rapidly almost with one single continuous movement, that is, there is no need to hesitate at the points where the angles would have occurred in a scalloped line. In fig. 34*e* the scallop is still further simplified, and has become a shallow wavy line, which is the easiest of all to make, and in *f* the wave has become thoroughly accidental, that is, it obeys the movements of the hand

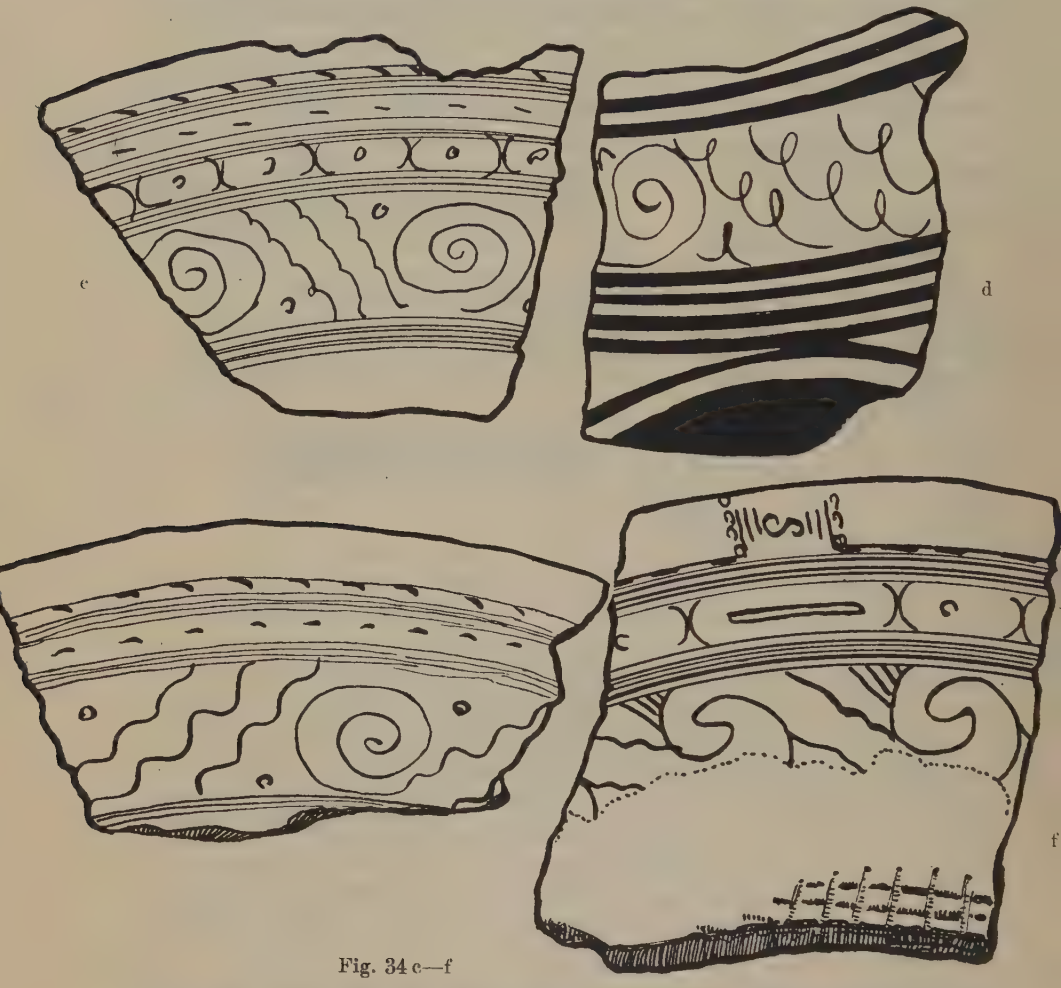


Fig. 34 e—f

without requiring any exertion beyond the mere passing of the brush on the surface in a slightly unsteady manner.

A different appearance has been given the rectangular terrace design in fig. 35*a*, by a process other than absolute calligraphic dominance. Evidently it was the potter's intention here to retain the appearance of the design, that is, its visual suggestion, and he

has done this more rapidly than he might have been able to trace a clear angular line. The spiral has been continued into a rectilinear slant, to which short dashes have been added. It is easily possible to recognize that the terraced line is meant. In fig. 35*b* the same method has been used, but here the dashes are thinner, so that the

Fig. 35

design presents a slightly more anomalous appearance than does *a*. In fig. 35*c* the spiral has been broken short, and the line with dashes has been reduced to a line of dashes, which suggests the lines in *a* and *b*, but is far removed from the typical spiral and terrace design. These dashes have been made so rapidly that in

one case they join to form a small semi-circle, and if this tendency were followed further, the line of dashes would have become a scalloped line, but by a process other than that which produced the scalloped lines in fig. 34*b* and *c*.

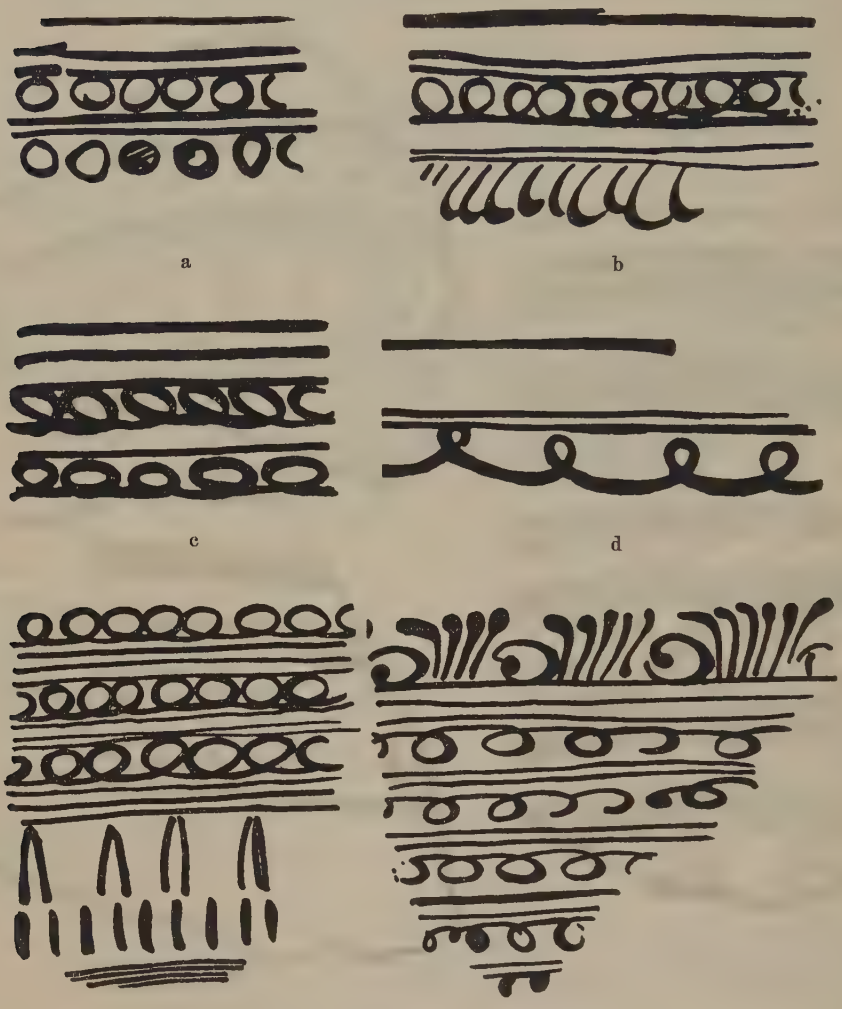


Fig. 36

One of the most frequent calligraphic transformations of the circle appears in the series fig. 36 *a*—*f*. In *a* the circles are made independently, and more or less neatly formed. In *b*, they appear to have been made independently, but in reality they have been

made by a continued line looped widely, and made more or less carefully straight at the bottom so that it appears to be an enclosing horizontal line. The way in which the circles were made is revealed by the slight raising of this basic line at the right, and it may be seen that an enclosing horizontal line was made with which the lines of the loops coincide. In fig. 36*c* this horizontal line no longer exists, although its corresponding line at the top of the series of loops has been made. The basic line of the loops itself functions as the horizontal. In *e*, the appearance of circles has been entirely discarded, and the line is frankly a continued series of loops.

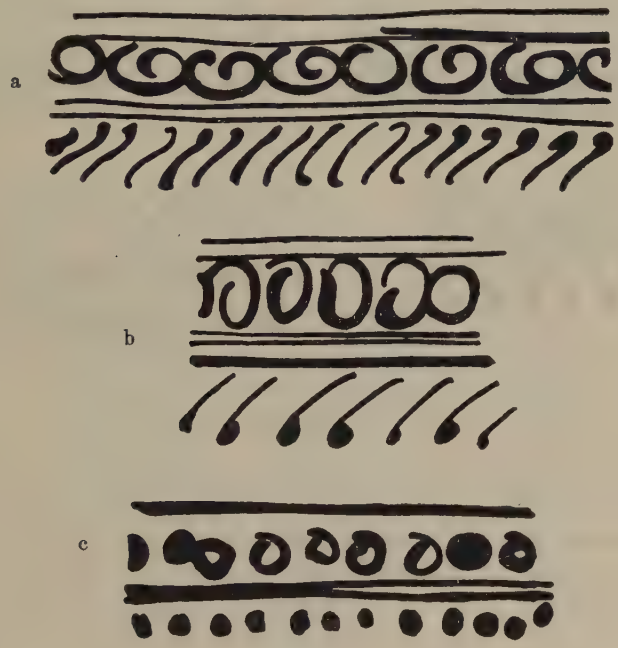


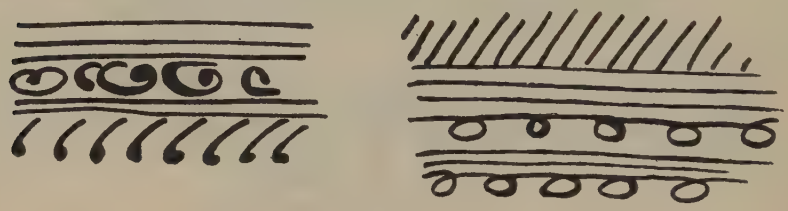
Fig. 37

Two influences seem to have determined this change. In *a*, *b*, *c*, and *d*, the circles and later the loops, were made from left to right, with great freedom of movement and would therefore, bring about the tendency to spread. Furthermore, all of these series have been made on the outsides of vessels, which, by a greater convexity, would emphasize the spreading. In another specimen, not here illustrated, the series has been made from left to right, but on the inside of a vessel, and the loops are therefore slightly closer together than in *b*, which it more nearly resembles. In fig. 36*f*, the series of loops

occurs on the slanting rim of a flat plate. The loops have been made from left to right. They spread at the top and are closer together on the bottom, since here the space would be smaller and the freedom of the hand somewhat restricted by the fact that it was working at the bottom of the inner side of the rim.

In the series 37 *a*, *b*, and *c*, the decoration is on the outside. The circles have also been made from left to right. In *b* most of them have been changed into spirals. In *b* most of the circles are open; in *c* they are closed but irregular.

The final determinant of these influences to be considered, would be the motor habits of the individual, which in every case would vary at least slightly from those of every other, and would have some influence on the calligraphic transformation of the design. Unfortunately it is impossible to compare vessels the design and style of which are similar, with definite certainty that they were decorated



a b

Fig. 38

by different individuals. However, it is possible to determine in how far the shape of the surface and the direction in which the work proceeded affected the design made by a single individual, by means of fig. 38, unless the inner and outer sides of the vessel were decorated by different men. The inner side *(b)* was worked to the right, and in spite of the concave surface the design is looped and spreads, whereas on the outer side *(a)* each circle starts with a movement to the left, and the circles are separate but set closely together. It is possible that specialization had so far proceeded that different men decorated different portions of the same vessel. In the case of Culhuacan ware this would be comprehensible, for if the outside were decorated first the decoration of the inner side could not be made immediately afterwards, and the vessels may thus have been decorated on the outside by one person; left to dry; and decorated on the inside by another. Such a proceeding would not be anomalous where the object desired was rapid manufacture of vessels in large quantities.

It has been seen that circles, rapidly made and especially from right to left, tend to become spirals. The opposite occurs in fig. 39*b*, where spirals worked rapidly to the right tend to close into circles. Fig. 39*a*, illustrates a series of spirals made into a continuous frieze, and fig. 39*b*, illustrates this same series made rapidly. Two spirals at the extreme left have been closed into circles. The lower row of spirals tends less in the same direction. Here the calligraphic

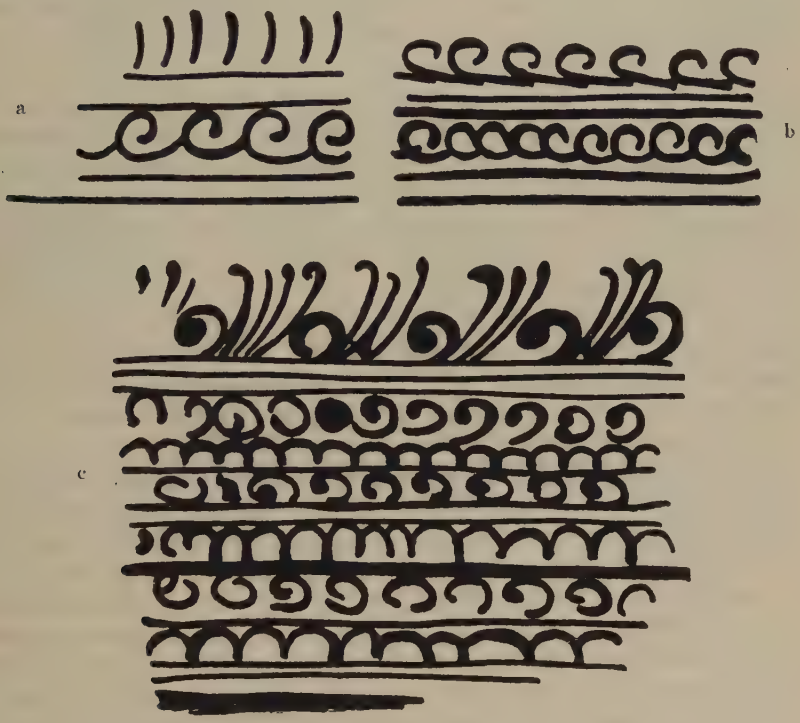


Fig. 39

influence has elongated and slanted the initial line in the spiral, so that the form assumes a shallow look. In fig. 11*e* (p. 31), the spirals have become joined semi-circles, that is, shallow spirals, set closer together the farther inside the rim they are, and at the top the spiral slants greatly, and has become a mere hook. This form, it will be remembered, is similar to the form taken by straight lines in a fringe, made rapidly.

Fig. 39*c*, is an example of the way in which originally dissimilar forms coincide through calligraphic transformation. The rows of

scallops made up of semicircles suggests that the forms above, correspond to the dashes or rays seen in fig. 27, 28, 29 and 30 (pp 61—64), and seen calligraphically transformed in three cases in fig. 30*c*, into semi-circles. It is impossible to tell whether here dashes, spirals or circles were intended, since hooks, semi-circles, spirals and circles, all occur in a continued series as if they were identical motifs.

The transformations just discussed reveal the extreme flexibility given to simple elements by the free operation of the automatic movements of the hand, to the point of identification between angular and curvilinear forms. These forms have all been simple elements, employed independently, and operated upon in a way peculiar to each. The same influences operating on a design made up of more than one simple form, which is kept together as a design-complex, give in the case of the series 40 *a*—*s*, a different series of transformations and a somewhat novel result. This design-complex is made up of two of the elements in the motif on the rim of *a*. This design recalls the serpent-profile, with upper jaw and crest, but the hook between the two spirals does not correspond to the serpent-profile made familiar in this study. It may possibly be indeed the upper jaw, crest, and a crest-plume of a serpent-profile, but this problem is immaterial to the analysis of its transformations, and it is therefore considered a non-representational design-complex.

In fig. 40*b*, the shorter of the two scrolls has been discarded. This type of change has been made familiar in a previous discussion. The design-complex which is retained through the series is made up of the longer scroll and the hook, as it appears in *b*. In *c*, the hook has been somewhat separated from the spiral, but they both start from the same point. Furthermore the form of the hook now approximates the deeper curve of the spiral. In *d*, the two forms appear associated, but separate, and the form of the hook resembles the spiral even more closely, due most probably to the fact that they were made with closely similar movements. In *e*, one of the lines of the hook has disappeared. The two upper lines are identical in form, and start from the same point, much as if the lower line of the spiral had also been dropped. This lower line is made in such a way that it merely outlines the spiral. It will be noted that the design appears upside down, due to the fact that it has been made on the outside of the vessel, as in cases previously noted. It has been placed in its familiar position in order to make comparison easier. In *f*, spiral and hook are made with the same kind of movement. They are separate, and the lower line of the spiral is outlined as in *e*. In some cases however, the hook has been placed above the spiral, and the movement continued, so that the form becomes a double hook. The clearest

Fig. 40

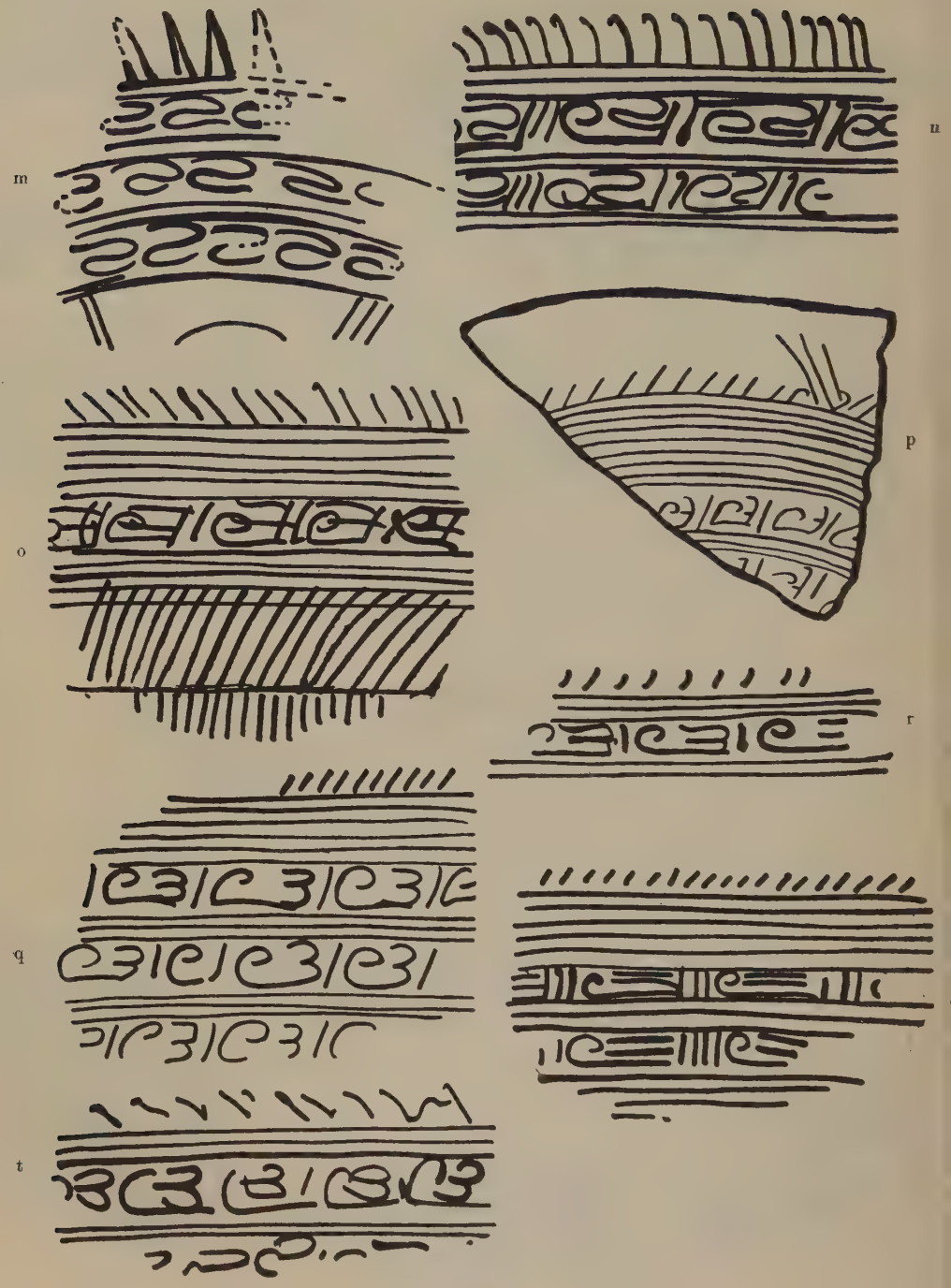


Fig. 40

illustration of this appears at the extreme right of the lowest row. In *g*, this change is definitive. The lower line of the spiral has been dropped, and the linear complexities of the design occur above, where the hook has added another line, as it did accidentally in *f*. In *h*, the hook is placed close to the spiral, and is sometimes joined.

The curves of the hook have been again multiplied in *i*, so that the design is now made up of a spiral and a wavy line. In some cases this line joins the end of the spiral, and in others the spiral curves upward and joins the hook, showing a tendency to amalgate the two, which is completely carried out in *j*, where the spiral continues into the multiplied curves of the hook. In *k*, the long line of the spiral has disappeared, and the design is made up chiefly of the hook with a short scroll attached at indeterminate points. The hook is used as an independent design in *l*, and is elaborated by a double line. It alternates with short dashes. In *m*, the dashes have been discarded and the double hook is used independently.

In its complex form, the design is transformed into a spiral and hook alternating with vertical lines in *n*. Vertical lines are joined in turn to the spiral or the hook in the upper row. This further complication is adopted into the design in *o*, where the curve of the hook is supplanted by the straight line which it closely adjoined in *n*, and there is furthermore a tendency to introduction of the horizontal lines from one motif to the other. In *p*, the design is made up of a spiral and an attenuated somewhat angular hook. This character most probably has been derived from the hastier *n*, and *o*, and it has here been adopted as a stylistic element of the motif, as is proved by the fact that the design was not made hastily.

The spiral and hook are treated partly as separate motifs, and partly as one, in *q*. In the amalgamated form this design recalls a conventionalized hand. In *t*, the two elements are treated separately, and the spiral has hardly become more than an elongated hook. The two elements are still made separately, but are treated as one, in *r*, except at the extreme right. Here the hook has become two simple parallel dashes. This version, due to calligraphic influence in *r*, is adopted and is used in *s*, where the originally complex design has been reduced to an elongated spiral with two horizontal lines. At the left, in the upper row, the line of the spiral converges with the adjoining parallel line in the same way that parallel lines were observed to converge before, forming rays.

It is not contended that the transformations traced occurred in the order in which they have been given, since this order was determined by the tracing of the extreme development of several different tendencies observable. Actually, all these changes occurred

in the same period, and were all determined by the same conditions, namely, the dominance of the calligraphic factor due to the rapidity with which the designs were made. The use of designs produced in this way marks a change in style, and it is not necessary to assume that the conditions which produced the design were necessary to its employment, since, as has been seen, once produced, it is reproduced by decorators who were not as hasty as the originators of the motif they adopted. The variations between these designs are therefore due to individual differences under the same general conditions, that is, to varying visual and motor habits.

III. Rhythm.

It is difficult to define exactly what is meant by rhythm in decoration. Perhaps this aspect of style can best be described in terms of spatial relationships, that is, as the relationships between the spatial intervals characteristic of a decorative style, and still more definitely as the spatial relationships between the elements of one decorated object. These relationships are one aspect of composition, and have in part been included in that discussion of Culhuacan decoration, but "rhythm" and "composition", although they overlap, are not interchangeable terms, since composition includes also formal relationships, that is, symmetries or asymmetries between the forms of the design motifs as well as between spaces, and rhythm, on the other hand, includes kinematic as well as spatial relationships.

Rhythm in decoration depends on the form of the zone decorated and is established by the spatial intervals between identical design-motifs and colours, but this does not mean that a rhythmic arrangement must necessarily be a regular one; some kind of relationship establishes a rhythm, and the only unrhythmic composition would be one in which each design-motif bore no relation whatsoever to any of the other elements of the decoration. A rhythm must be established by regularity of intervals between identical design-motifs of only one kind, even if used along with a great many dissimilar motifs, and also by such a relationship only between colours, the design-motifs all being dissimilar. These, however, are extreme cases, and most often a decorative arrangement repeats more than one element. It is thus repetition, and not identity of intervals, which establishes a spatial rhythm, but, obviously, repetition at regular intervals establishes a regular rhythm, whereas repetition at dissimilar intervals establishes an irregular rhythm. Several spatial rhythms, it is clear, can be established in a single decoration, by a repetition of elements at intervals dissimilar from other repetitions in the same composition.

Spatial rhythmic relationships between motifs are static; that is, the eye travels from motif to identical motif, because of their identity, and not because of any kinematic element in the motif itself. Kinematic rhythms are established by the forms of the design-motifs, in the sense that these forms may send the eye in a

special direction, as, for example, the spiral, the lines of which when followed visually produce a spiral rhythm. The "swastika" type of composition has been given as an example of rotary arrangement, and this is a common form of a kinematic rhythm.

Both these kinds of rhythm may be and are employed in one decorative style, and in the decoration of a single vessel, but there is no reason to assume that the use of one involves the use of the other, since they are dissimilar in character; one may be greatly elaborated and the other entirely excluded. Styles which employ both these rhythms and which command a great variety of design-motifs, tend to great complexity; as does Aztec design and Culhuacan design in a more limited but still complex manner.

The rhythmic complexities of typical Aztec design and Culhuacan decoration are not identical. Much of the complexity in Culhuacan design is indeed common to both, but a local style as differentiated as that of Culhuacan would be expected to develop rhythmic complexities peculiar to itself, as well as new design forms. The rhythmic complexities of Aztec design have been developed to the point of establishing, on a single decoration, several and often many different rhythms, and this complexity is increased in polychrome designs. But one striking further sophistication of rhythmic relationships occurs so frequently that it is almost invariable in Aztec decoration; this peculiarity may be described as the habit of breaking one or more of the established rhythms deliberately, producing spatial, formal, or color asymmetries. The device serves to give a greater emphasis to the broken or to the unbroken rhythm, and a polychrome design which employs more than one motif is frequently thus elaborated to an astounding complexity, and similarly a monochrome design which employs several motifs.

This type of spatial rhythmic complexity occurs throughout Culhuacan decoration. By its very character a design with broken rhythms appears anomalous to eyes accustomed to the exact balances of Greek design, and in Culhuacan decoration its association with careless execution gives the decoration an appearance of unskilled, undeveloped, or degenerate compositional aptitude, whereas it is the product of an extremely cultivated aptitude and its employment, whatever the technical execution, must be regarded as a deliberately employed trait of a sophisticated style.

Two typical Aztec designs are presented in figs. 41 *a* and *b*, in order to illustrate the use of the general rhythmic principle which has been described. Its application varies enormously, and its presence in complex form in two such simple designs as here presented, may help to indicate the variety of application to be ex-

pected in Culhuacan decoration. In fig. 41*a*, the outline of the design is the same on all four sides, but at only three of the four corners. Seen diagonally, with the right hand upper corner above, the outline of the inner portion is the same on the two sides of the upper portion, down to a certain point, or, to put it more clearly, one side is made up of four steps and the other of only three. The two spirals occupy dissimilar positions in their similar corresponding zones, and the spiral on the right is lower, in spite of the fact that the terraces of the side on which it is placed cease at a higher point than on the other side. In the lower half, the two circular outlines are the same up to a given point, but here the line is broken on the left whereas the terraced line is broken on the right above. Hori-

a b

Fig. 41

zontally and vertically both as here shown and diagonally, the outer outline of the design is spatially symmetrical except at one point, and the inner outline is totally different horizontally, being angular above and curvilinear below, while diagonally it is symmetrical except at two points, which are placed at analogous but not corresponding positions of their respective zones. The design as a whole is not, however, out of balance, but the balance is established both by symmetries and asymmetries, which latter are beyond a doubt deliberate as much as the former.

Fig. 41*b*, appears to be like *a*, a simple design, but its asymmetries are more subtly arranged than in *a*, so that at first glance the rhythmic breaks are not perceived. However, examination will reveal that the design is not totally symmetrical between any two

corresponding zones. The outline of the design is broken on three sides of the four, whereas it would be expected to be broken on all four sides, if it were symmetrical in a rectangle. It is divided, however, not into two or four or eight parts, as would be expected in a rectangle, but into three; that is, it is not composed along vertical or horizontal lines, but on diagonals only. The four sides are diagonally symmetrical, except at one point, or, more clearly, the outline of the two diagonal halves is the same except at one point: the upper right part and the lower left part agree formally, except at one point, and the upper left part and the lower right agree except at one point. The design is nevertheless perfectly balanced, and illustrates an apparently simple but really complex composition, since it is arranged simultaneously in two zones: around a spiral, and within a rectangle.

The division of symmetrical zones into unequal parts occurs frequently in Culhuacan decoration, both in centers and rims. Fig. 14 (p. 36) is a good example of a theoretical division of a circular zone into three parts, only two of which are marked, so that the composition consists of two parts, one larger than the other, divided vertically, horizontally, or diagonally, depending on the point from which the vessel is seen, but only in part, since the design is furthermore divided into two principal parts, an outer and an inner circular zone. The inner part is outlined by a circle and a row of scallops. It is divided vertically, horizontally, or diagonally, but in a direction diametrically opposite to the division of the outer zones, into five bands, in which the design is arranged alternately. The smaller part of the outer zone is also furthermore divided into three parts, and none of these three parts are decorated identically, since the rays of the middle portion have been continued into one of the smaller thirds. This asymmetry is probably of calligraphic origin. The smaller of the two spirals most probably was intended, like its corresponding spiral, to touch the outer rim of the zone, but a slight shift in spacing placed it at a distance from this outer rim, and this accidentally produced space was filled in with rays. One asymmetry was remedied by another, and this resort is indicative of the acceptability and frequent employment of asymmetries, as otherwise the correction would have been considered as bad as the error.

The central design on fig. 18 (p. 36) is a particularly clear proof of the fact that the Culhuacan decorator not only employed asymmetry or broken spatial rhythm in his composition, but preferred it. This design is divided by the principal line into two unequal parts, but the center of the circle is nevertheless marked and

emphasized, so that it is the chief point of attraction to the eye. The line over this central circle establishes the horizontal line, and the vertical is marked by rays, and below, by a double loop. The design in the upper half not only occupies a space of dissimilar size to that of the lower, but is itself dissimilar, so that the composition is symmetrical only on a vertical, with, however, one break in this symmetry in the lower half, where the two appendages on either side of the central motif are dissimilar. One resembles the central motif, the other is a spiral. Since an equal amount of space was available on both sides, there is no reason why the

Fig. 42

decorator should have balanced a loop with a spiral, unless the complete symmetry which would thus have been produced was aesthetically distasteful to him.

The employment of asymmetry determines the whole character of the design in fig. 42. The fragment is too small to permit the analysis of the entire central composition, but on the part available it is clear that the design was abruptly discontinued on the left, and the space filled with a hook, while the curve surrounding the central dot ends on this side in a small spiral. This design would appear to be a conventionalized representation of the head of a bird, and if indeed it was meant as such, its asymmetrical character raises the problem whether a stylistic trait was employed in order

to adapt a pictorial design to decorative purposes, or whether this stylistic trait is the result of using pictorial and hence often asymmetric designs, for decorative purposes. This question cannot of course be answered on the basis of Culhuacan decoration alone, since, as has been shown, the use of broken spatial rhythms is a frequent and striking stylistic trait of Aztec design as a whole, and therefore it would be necessary to investigate the entire history of Aztec design in order to discover what influences operated in the development of the use of asymmetries. Unfortunately not enough information is available now to admit a reconstruction of the history of Aztec design, so that the question of the history of the one trait discussed cannot be answered. Nevertheless, whatever its origins, it is clear that the use of asymmetries played an important part in Aztec design. It was employed in all the design-forms which appear in Aztec design and therefore also in pictorial forms. It was so prevalent that the frequent asymmetry of pictorial forms may be adequately explained by this fundamental stylistic trait.

The coincidence of pictorial design with design broken rhythmically makes the analysis of rim decoration on Culhuacan vessels especially difficult. It is not possible to analyze from this viewpoint any but complete vessels, since the composition must be seen as a whole, so that the material available is scanty. However, the examination of even the three complete rim designs reveals that although all three employ asymmetries only one of these three could be supposed to be pictorial. This is the rim of fig. 43[1]. The zone is divided into two parts, one of which is larger than the other; the upper part is smaller, whereas in the central design the upper part is larger. This would have occurred anyhow were the rim design to have been divided at exactly the same points as the central design, since the upper half of the central design occupies more space below the horizontal diameter, but the upper outline of the point of division is really above the middle horizontal, and, as may be seen, the rim design is raised still slightly higher on the left side. The lower half of the rim zone is divided again in two, almost at the exact vertical, but the division has been made so that the left lower field is slightly larger. Strikingly enough this slight enlargement of the rim corresponds to the slightly greater space occupied by the design-forms of the left side, since one of them, the spiral, is larger than its corresponding form, the loop, in the right half of the inner zone. Thus the entire composition would seem to be slightly askew, but its irregularity could hardly be ascribed to

[1] The same as fig. 18, p. 36.

carelessness or error, since the nature of the central design would indicate that the asymmetries were deliberately employed. The design-motifs in the rim zone are all dissimilar, that is, none of the motifs occurring in each of the three zones are repeated in any of the others, with the exception of the five small vertical lines in the left part of the lower half, which are similar to the motifs which occur throughout the adjoining zone to the right, and the repetition, in part, of the first design in the lower left zone and the last design in the upper half. These two repetitions establish a relationship between all three zones. Such an almost completely

Fig. 43

asymmetrical rim decoration, associated with a possibly pictorial center, raises the suspicion that the rim decoration may also be pictorial, particularly as the design-motifs employed in it recall, like the center, parts of serpent-profile conventionalizations. This question could not be answered except by the decorator himself. It is just as probable that he intended no special representation, but employed motifs which occur in pictorial representations, adapting them in part to the decoration of a central circular and a rim zone.

This is precisely what the decorator of fig. 45[1] did, and insofar as the rim decoration is concerned, there can be no question here of whether or not a pictorial representation was intended. The zone is divided into two parts of unequal size; one occupies approximately two-thirds of the space, the other the remaining third. This dissimilar third corresponds to the upper left half of the central design, and when the rim and center are examined as a single composition, it will be seen that both are composed with two zones in mind: a triangle, and a circle. The triangle is marked by the shape of the central nucleus, and by the division of rim zones; the circle, by the rays of the intermediate zone and the dashes and scallops adjoining the central design, and, on the rim, by the continuation of the larger half of the design two thirds of the way around the circle, thus emphasizing the curvilinear character of the zone. The rim decoration in turn is treated partly as circular, and partly as a horizontal zone, or rather, simultaneously. The design-motifs are repeated one after the other at regular intervals, as on a horizontal symmetrically composed decoration, but the zone is divided in a way that would be anomalous were it horizontal. In the larger part, a complex design-motif is repeated four times, with an additional spiral at the end. In the smaller part, two simpler motifs are used alternately, in a continuous frieze. The design-motifs in both parts are associated with the serpent-head profile, but here dissociated and used independently for decorative purposes. Their association with a similarly pictorially-associated design would perhaps raise the question whether this type of rim is pictorial in derivation, if not in intention, but an extremely similar arrangement occurs on fig. 3, whose center is evidently non-pictorial.

Fig. 44[2] is unfortunately incomplete, but it is possible reasonably to infer from the large fragment that the rim was divided much as the rim of fig. 45 that is, into a larger and a smaller part; the larger furthermore divided into two, so that the decoration is composed of three zones, two of them closely related. The central design is divided into four parts; the divisions of rim and zone therefore, could not coincide. The lower part of the larger rim zone is larger than its related part; the upper part contains three double loops and the lower was most probably made up of four. This occurs in a curious manner: apparently the six vertical lines which mark off the upper half from the lower half, have been substituted for a double loop, and the three corresponding scallops

[1] The same as fig. 4, p. 25.

[2] The same as fig. 3, p. 25.

Fig. 44

Fig. 45

have been omitted. The lines which begin the lower part are separated from these, and correspond in number to the lines which separate the upper part from its unrelated adjoining zone. This abrupt break and substitution of one design-motif for another is a typical employment of asymmetry and broken rhythm, and may be found throughout Aztec design, the substitution and break being made very frequently with colour instead of with space and linear form as here. The habit is strikingly illustrated on the rim of fig. 6 (p. 27) where the fringe is interrupted by a small flourish, and in fig. 40*p* (p. 80), where the fringe of a carefully formed oblique ray is interrupted by a line-motif oriented in the opposite direction.

In addition to the complexities of spatial rhythm that the decoration of Culhuacan shares with the whole of Aztec design, some of these compositions employ a type of kinematic rhythm peculiar to Culhuacan. Kinematic rhythms have been defined as rhythms of direction, rather than of spacing, and the simple example of rotary rhythm produced by a curvilinear or angular swastika was cited. This and other types of kinematic rhythms occur in Aztec decoration other than that of Culhuacan, and fig. 44 is a good example of the use of kinematic rhythm in a way not unique to Culhuacan. On the other hand the use of kinematic rhythm as in the central designs of figs. 6 and 7 (p. 27), the rim design 8*b* and *c* (p. 29), as well as others which have been mentioned in the course of this analysis, is a local development. All the examples mentioned illustrate the same use of kinematic rhythm. The static composition is given a rotary movement in one zone, or in one part of a zone, which movement emphasizes and is emphasized by the static composition of the rest of the decoration. Specifically the rhythm is produced by the change of straight lines into shallow curves or into diagonals, due to the freedom of movement allowed the hand for the sake of rapid execution; thus the development is a by-product, as it were, of the technique preferred because it is best adapted to the purpose of the potter. This "accidental" development is then adopted as a stylistic trait by being intentionally reproduced, as in fig. 7 (p. 27).

IV. Conclusion.

If this analysis has proceeded correctly, it will have established that the domestic pottery of Culhuacan is a locally differentiated development of Aztec domestic pottery, which is not locally unique as to the forms of the vessels, the design-motifs employed, or the arrangement of design, and that indeed it shares most of its typical designs, compositions, and stylistic complexities, with the whole of Aztec decoration. But the decoration of Culhuacan ware is very different in appearance, from typical Aztec decoration, and this difference is superficially describable as hasty, even slovenly, execution as contrasted with the rigid delineation and spacing of typical Aztec design. Thus even superficially the local differentiation appears to be determined by a difference of technique The conditions which determined this differentiation of technique, and the changes made by this technique on the design-content and arrangement of Culhuacan decoration should therefore explain the stylistic change or differentiation for which Culhuacan pottery is of special scientific interest.

Culhuacan, it has been inferred, was a pottery-making center which supplied domestic ware to much of the surrounding region, and the need to make large quantities of usable ware of no great value apparently tended to make hasty production primarily desirable, and the technique was developed under this pressure. The point of view of a Culhuacan potter would therefore differ from the point of view of a potter making an object for purposes which would require beauty primarily, and thus both the ware and decoration of Culhuacan pottery developed under different influences.

Decoration was not discarded as would be expected in the making of a vessel primarily useful, because, it may be supposed, the habit of seeing decorated vessels established the viewpoint that a vessel was not really completed unless decorated. A technique which met the requirements of Culhuacan potters and at the same time preserved the habit of decoration, as well as specific stylistic habits, was therefore increasingly developed. This technique shifted the control of the design from the eye, or mind, to the hand, and the free operation of automatic motor habits affected profoundly design-content and composition, and developed new designs and

compositions by transforming previous forms and arrangements calligraphically.

The chief factor which determined the stylistic differentiation of Culhuacan decoration is therefore technical, dependent specifically upon the possibilities and tendencies of the decorator's hand when rapidly moved. This stylistic differentiation did not proceed chronologically, that is, no "evolution" in the chronological sense of the term, can be traced in the development or transformation of the style itself, of specific designs, or of any other component, since the development proceeded purely according to the intensification of the technical influence which originated the tendency, and was itself dependent on economic and social factors.

Bibliography.

Orosco y Berra, Historia antigua y de la conquista de México, México, 1880.

Best-Maugard, Adolfo, Método de dibujo. Tradición, resurgimiento y evolución del arte Mexicano, México, 1923.

Boas, Franz, Primitive Art. Oslo 1927.

— —, Album de Colecciones Arqueológicas. Pub. de la Escuela Internacional de Arqueología y Etnología Americanas. Introduction by Manuel Gamio, México, 1912 y 1921.

— —, Anexo al Informe del Presidente de la Junta Directiva de la Escuela Internacional de Arqueología y Etnología Americanas, México 1913.

Holmes, W. H., Origin and Development of Form and Ornament in Ceramic Art. 4th Report American Bureau of Ethnology, 1882—83.

Peñafiel, Antonio, Monumentos del Arte Mexicano Antiguo, Berlin, 1890.

Sahagun, Bernardino, Historia de las cosas de Nueva España, México 1829.

Strebel, H., Über Ornamente auf Tongefäßen aus Alt-Mexiko, Hamburg, 1904.

Codex Borgianus, Rome, 1898.

Codex Fejérvary-Mayer, Berlin and London, 1901-2.

Codex Magliabecchiano, Rome, 1904.

Codex Nuttall or Zouche, Cambridge, Mass., 1902.

VITA.

The author, Anita Brenner, was born in Aguascalientes, México on August 13, 1905. She attended Lady of the Lake College 1921—1922; University of Texas 1922—1923; National University of Mexico 1923—1925. Graduate studies in anthropology under Franz Boas, Ruth F. Benedict and Gladys A. Reichard at Columbia University 1927—1930.